THE IRON AGE

Published every Thursday Morning by David Williams Co., [illegible] Place, New York.

Vol. 81: No. 15. *New York, Thursday, April 9, 1908.* $5.00 a Year, including Postage. Single Copies, 15 Cents.

See our Ad. on page 15

See page 53

SEE PAGE 23

THE IRON AGE

New York, Thursday, April 9, 1908.

Iron Mining in Cuba.

The Old and the New Properties of the Spanish American Iron Company.

However widely opinions may differ concerning the dangers of an exhaustion of available iron ore resources, important additions thereto will be welcomed, particularly when they are directly available to the American steel industry. Since the discovery of the Mesaba range, and the opening up of the deposits of Lapland, no addition to the world's iron ore resources approaching that found in Cuba has been made.

The Cuban Discoveries of High Importance.

These discoveries are of international importance, but primarily will assure the future of the steel industry of our Eastern States and our Atlantic seaboard, which, since the opening of the Mesaba mines, has been gradually driven on the one hand in the direction of producing specialties, and on the other hand of relying upon old material to feed its steel furnaces.

The known new deposits of the north coast of Cuba are so extensive that it is likely that the steel producing interests controlling them will ultimately supply the open market on both sides of the Atlantic with increasing quantities. Primarily, of course, the possession of the new deposits absolutely assures the future of the two allied works, the Pennsylvania Steel Company and the Maryland Steel Company—so far as ownership in raw material is a guarantee of life. But it is well to emphasize the probability that the influence of the ore developments in Cuba goes far beyond that range, narrower from the standpoint of this country's steel industry.

Significance of These Developments Not Realized.

The iron trade at large does not as yet appear to have fully realized what the near future will bring as the outcome of the new developments on the north coast of Cuba. The significance of the opening of distant fields is usually not measured correctly until the full force is felt by shipments on a large scale. It was not until the markets for pig iron and finished materials crumbled under the enormous weight of cheaply mined Mesaba ore that iron manufacturers in competitive districts not supplied from the new Lake range began to wake up. Their attitude in the earlier days was characterized by that of an iron maker who was then a leader in the Birmingham District. He declined an opportunity to visit the new range on the ground that no discovery anywhere could hope to rival in advantages those of his own district, and waived aside reports relating to the new range as the fabrications of wild boomers.

We believe that we have detected the evidences of a similar attitude on the part of some authorities in the iron trade toward the new developments in Cuba. There are some circumstances which may seem to justify a conservative attitude, and which have caused the interests that are now committed to the opening of the mines to move with extreme caution.

Unique Features of the Deposits.

The deposits themselves are unique in many respects. They are enormous in extent. They can be mined at a cost which can only be duplicated elsewhere under exceptional circumstances, for comparatively very limited areas. Suffice it to state that it is a question of excavating by steam shovel tens of thousands of acres of a deposit of ore averaging a thickness of 15 ft. at least, without any stripping whatever! Suffice it to say that operations have begun with only the smaller of two tracts, the Mayari, and that for the present there is in reserve a second larger tract, the Moa, which it is not proposed to touch for the present.

The cardinal facts are therefore an enormous quantity of Bessemer ore—many hundreds of millions of tons—all of which can be mined at an unprecedentedly low cost. But a very large capital outlay is necessary, the amount required to prepare for a tonnage of 1,500,000 tons per annum of ore ready for shipment being $4,500,000, including the acquisition of the property, the cost of exploration and development, the transportation facilities, drying and clinkering plant, the loading appliances, harbor works, and the housing of the employees. A considerable part of these capital charges is independent of the tonnage produced, and this points in the direction of a steady expansion of operations and the seeking of wider, outside markets, in order to lessen the fixed annual charge and the amortization per ton of product.

Some Offsets to Low First Cost.

The character of the ore offsets to some extent the advantages of very low first cost. The ore approaches clay in its consistency. It carries about 40 per cent. of water, and its physical condition is such that it must be agglomerated before going into the blast furnace. It is unusually high in alumina, so that questions arose as to its behavior in the blast furnace and the fuel requirements in smelting it. It contains 1.70 per cent. of chromium, concerning the elimination of which in steel making there were no precedents. Experiments on a commercial scale running over several years have, however, been made at the works of the Pennsylvania Steel Company, which have solved satisfactorily the chromium elimination. It is interesting to note that the same subject has been before Bolckow, Vaughan & Co., Ltd., Middlesbrough, England, and the experiments carried out by them were described at the London meeting of the Iron and Steel Institute in May, 1907, by Arthur W. Richards.

A direct and unavoidable charge to the cost of mining which these peculiar features of the ore imposes is the necessity for drying and clinkering the ore. It means that nearly two tons of the ore in place must be mined to obtain one ton of dry shipping ore, and that this nearly doubles the cost of excavation and transportation to the harbor, where the drying and clinkering plant is being installed. Were it not for the fact that this mining is so exceedingly low in cost, this circumstance might be regarded as being of some importance.

The Ore Carries Nickel.

One highly important fact of great compensating value, so far as the peculiar character of the ore is concerned, is that the Mayari ore carries nickel, which goes through the different metallurgical processes and is ultimately found in the steel, the quantity being about 1.5 per cent. While this is below the nickel contents of the special nickel steels which have been so successfully used in rails to meet particularly severe service, for which 3 to 5 per cent. has been adopted, still there is little doubt that the presence of the smaller quantity will materially contribute toward higher capacity to resist wear. To what extent the presence of 1.5 per cent. of nickel will find expression in a higher selling value of certain steel products, or will secure preference from consumers at equal prices, is, of course, a matter which the future must develop. Thus far, too, it is a question whether the chrome by-products obtained are capable of profitable utilization.

In its broad lines such is the situation so far as the new Cuban developments on the north coast are concerned. The balance drawn between the advantages and the drawbacks, although the latter can not yet be measured to the last cent, leaves the former in so commanding a position that the effects of the new developments upon the American steel industry must be far reaching. These

developments place the Pennsylvania Steel Company and its affiliated interests in a commanding position, with an unlimited supply of cheap ore. For some years that company has enjoyed, through the operations of the Spanish-American Iron Company in the Santiago District, a large supply of hard Bessemer ore at a low net cost. The future of this supply is absolutely assured for years, but the nature of the new deposits is such that they can be relied upon for generations.

There is evidence that the ore formation of which Mayari and Moa are parts extends over a considerable part of northern Cuba; in most instances, however, the deposits are too shallow or too lean to justify developments. Reference may be made, by way of illustration, to the large acreage of a deposit of about 1½ ft. of ore on the line of the Cuba Railroad at Ciego de Avilla and vicinity. Iron ore has also been found at numerous points in the western part of the island.

In the province of Pinar del Rio a high phosphorus ore has been found at Loma de Hierro, but it will require the building of a 35-mile line of railroad to reach a shipping point in Gudiana Bay. At Tortugas, near La Palma in Pinar del Rio, a shallow deposit has been discovered which is in character similar to that of Mayari, although understood to be somewhat lower in iron. Mulata is 7 miles from Mulata Bay, and 20 miles from Bahia Honda.

Cuban Mining Laws.

The Cuban Government is very liberal in its efforts to encourage mining enterprises. The present mining law dates back to 1868 and is administered in a very liberal spirit. There is no fee for filing claims, nor annual payments, nor royalties. The only payments are a deposit to cover the cost of the survey, an excess over that cost being refunded, and 50 cents per hectare for executing the title. The claim must specify the mineral found. The miner may condemn what land is needed for his operations and the land owner must sell at a maximum advance of 20 per cent. over the appraised value. These liberal laws have had the effect of encouraging a good deal of speculative filing of mining claims, with little intention on the part of the claimants to do any serious prospecting or development work, but it rarely takes long before extravagant notions of values disappear and reasonable royalties are accepted.

There is every evidence to encourage the belief that the mountain ranges of the eastern part of Cuba are rich in minerals, but prospecting in the jungles is fraught with very serious difficulties, notably on the northern flank of the Maestra range. Besides, the lack of transportation in the Cauto valley, fertile though it be, makes it impossible to go much beyond the prospecting stage at the present time. The very fact, however, that the Cauto valley, with Manzanillo as its outlet, is quite well cultivated and rich makes it probable that the railroad will soon open it up and give facilities to the development of the known deposits on the north flank of the Maestra range.

The Labor Problem.

The labor problem is a serious one in all parts of Cuba. In the eastern end a considerable proportion of the population (probably three-fourths) is of African race, and while fairly sturdy is not, generally speaking, very intelligent. The climate, on the whole, is not inimical to sustained physical effort, but nature is so bountiful that the necessities of life are readily obtained. So far as mining enterprises are concerned, there is competition for hands during the sugar cane cutting season, the estates generally drawing heavily upon the mines for labor. For common labor, reliance must be had upon the native, and while the per day rate is relatively low, the efficiency, too, is below the average. The nominal rate of $1 per day is not therefore so low as would appear at the first glance.

For more skilled work, the native labor has not been found either efficient or reliable. At some mines the system of letting contracts based on output of ore to small groups of men has been found to work out quite well, but the main reliance for actual miners has for years been a flow of immigration from northern Spain, through the intermediary of agents resident in that country. Sturdy and steady, eager to accumulate what is to them a competence, the Spanish miners are good workers, but the majority of them return to their homes after a stay varying from one to three years, so that constant recruiting is necessary. Both the Juragua and Spanish-American companies have devised systems for encouraging steady work. There has also been adopted the tarea, or task, system in mining, based on a day's work of a given number of cars of ore or of waste.

THE DAIQUIRI MINES.

Attention was called first to the iron ore deposits on the southern coast of Cuba, near Santiago, about 25 years since, by Alfred Earnshaw, an iron importer of Philadelphia. He induced the Pennsylvania Steel Company and Bethlehem Iron Company to investigate the deposits. Fred W. Wood, then of Steelton, Pa., studied the situation, visiting every outcrop then known in what was then an almost inaccessible jungle. During the first half of the nineteenth century a large part of the country had been under cultivation, there being extensive coffee, sugar and cacao estates, largely in the hands of French planters. These had been utterly destroyed during the first war of the revolution and the land had relapsed into wilderness. Practically the only guide to the estimation of the extent of the ore and to its character was a large amount of float, which in later years, in the case of some other enterprises, proved a very treacherous indication. Ultimately the Juragua property was selected as the most promising, and a limited partnership for 20 years was formed by the Pennsylvania Steel Company and the Bethlem Iron Company, under the laws of Pennsylvania, to operate the mines. At the expiration of the partnership the Bethlehem Company purchased the interest of the Pennsylvania Company in the Juragua property and has since operated it alone.

The opening up of the Juragua mines gave a great impetus to mining in the district, among those attracted to it being Samuel P. Ely and George H. Ely, Cleveland, Ohio, who had had a successful career as ore merchants and mine operators on the lake ranges. They acquired the property close to Daiquiri. Associated with them were Colgate Hoyt and John D. Rockefeller and C. W. Harkness of the Standard Oil party. The Spanish-American Iron Company was formed, with a capital stock of $800,000, which subsequently issued $250,000 of debentures and $250,000 of first mortgage notes. The operations were not financially successful and matters were practically in a deadlock when, in 1894, Charles F. Rand, who had been identified for years with the Aurora and other mines on the Gogebic range, was called somewhat suddenly to the presidency. Persistent work along broad lines developed the mines and led to increasing output with growing efficiency of the entire plant and organization.

On April 1, 1901, the Pennsylvania Steel Company acquired the entire capital stock of the Spanish-American Iron Company, Mr. Rand remaining the president. With the active backing of the new interests the property has been made a model enterprise in every respect, has been very successful financially and has accumulated a large surplus, although every improvement has been charged off to operating expenses year after year. From 1895 to 1907, both inclusive, 4,036,451 tons of ore have been produced, and there are now in sight, estimated on the most careful and conservative basis, 2,656,000 tons of ore in all the mines.

Ore in Sight and Exploration.

The methods of estimating ore in sight have been well tested in the case of numerous small operations dealing with isolated deposits. In the case of the principal group of mines there is only included what is technically in sight by actual discovery in mining operations, so that the probable life of the mines is far longer than the tonnage revealed would indicate. The determination of the ore in sight possesses value chiefly because it enables the management to judge whether a given expenditure for betterments may be safely made.

It has always been the policy to explore the ore bodies well in advance of actual mining operations, so that the

latter may be conducted with a clear conception of the effect of current work upon the cost and facility of extracting ore at future times. In open cut working the removal of overburden and waste and the disposal of spoil, if not conducted in a comprehensive manner, may seriously compromise the mine at a future date, or at least gravely affect the cost of production. The management of the Daiquiri mines therefore conducts, through tunnels and shafts, an extended system of exploration well in advance of current mining. The system followed is to keep the exploration drifts and tunnels along the contact of the ore and the gangue, and this is the only underground mining which is done. During the past year the system has been adopted of basing the estimates of ore in sight upon a series of cross sections from 25 to 50 ft. apart, so that they reflect, as closely as it is possible with so irregular a deposit, the minimum quantity of ore actually available even though practically every opening might cease to show ore further on.

The Vinent Group.

The ore properties of the Spanish-American Iron Company have been divided into two groups: the Vinent group, so named after the Marquis of Vinent, who owned a large plantation in the district, the only relic of which to-day is the ruin of an old sugar crushing mill close to the village of Daiquiri, and the Berraco group, which includes a considerable number of mines to the east. To the west the property of the Juragua Iron Company adjoins that of the Spanish-American Iron Company, at no great distance from the Vinent mines. While the existence of some ore deposits is known in the intervening territory, the amount of ground available in that direction to the Spanish-American Iron Company is not large.

The Vinent group includes the Lola, Magdalena and San Antonio mines (practically one operation), on Lola Hill; the Providencia, which crowns an adjoining mountain, and the Alfredo. The Berraco group, which is scattered to the eastward and made accessible through a 10-mile narrow gauge railroad, includes a series of smaller mines, of which some like the Berraco, Concepcion, Elvira, Fausto and Fausto Segundo have been either wholly or largely exhausted, and of which others like the Norte, San Sebastian, Escondida, Falconera, Ceres and Vesta are newly developed mines. These, however, are of minor importance, so that the question has even been discussed of entirely abandoning the Berraco Railroad. Out of the total production in 1907 of 500,330 tons for the whole property, the Berraco mines furnished 107,508 tons.

The chief interest centers in the deposits of the Lola Hill, a cone shaped hill, which rises from the valley to the hight of about 850 ft., with the Lola mine, the first opened, flanked by the Magdalena on one side and the San Antonio on the other. In the accompanying general view of the camp the Lola mine is seen occupying the crest of the hill, while the San Antonio is to the right, somewhat lower. The Magdalena is not visible in the view shown, being hidden by a spur of the hill.

The Lola Hill Ore Deposits.

While some suggestion may be traced of an original lenticular form, the deposits have apparently been subjected to so many and such violent changes that they are highly irregular. While in place the ore occurs in great masses, yet it is difficult, if not impossible, to convey any exact impression of the character and extent of the deposits by quoting dimensions. Their form and thus far their position have made open cut working the only system available, although the increasing amount of overburden has at least raised the question whether lower cost might not be attainable by underground mining. We believe that thus far a careful study of the figures has pretty emphatically answered that question in the negative. It is a fact, however, that both of the great companies find their costs increasing through the necessity of removing a larger quantity of waste. In the case of the Lola Hill mines this has now risen to 2.36 tons of waste per ton of ore produced. It was less than half of that in the earlier days. The recent discovery of deep bodies of ore, mostly in the Lola and Magdalena mines, may, however, again bring up the matter of underground mining.

The general layout of the Lola Hill mines and of the ore bodies is shown in the accompanying general plan. The hatched surfaces represent the ore, the darker areas indicating its extent on the slopes between the different levels, while the lighter shade shows the ore in place on the floors of the cuts. The areas of intermediate hatching indicate mixed ore.

Wherever ore has been encountered in exploring tunnels, the plan shows where the drift is in solid ore, where the ore is in the upper part, where in the floor and where on the side. Recently good ore has been somewhat unexpectedly discovered in the highest cuts of the Magdalena mine during the work of removal of the overburden. In the main body of the same mine bunches of largely oxidized copper ore have been discovered. When the Cobre smelter was in operation this ore was picked out and was shipped to that plant. In some of the lower parts of the Magdalena, too, patches of ore higher in sulphur have been discovered.

The Character of the Ore.

The ore, however, is very uniform and is low in phosphorus. The average of all the mine analyses during 1906 was 57.40 per cent. of iron, 11.80 per cent. of silica, 0.038 per cent. of phosphorus and 0.20 per cent. of sulphur. In 1907 the average was 57.80 per cent. of iron, 10.80 per cent. of silica, 0.034 per cent. of phosphorus and 0.18 per cent. of sulphur.

During 1907 the average of 94 cargoes shipped was 56.67 per cent. iron, 11.80 per cent. silica, 0.032 per cent. of phosphorus, 0.21 per cent. of sulphur and 0.687 per cent. of moisture. The maximum, in eight cargoes, was 57.28 per cent. of iron, while the minimum, in 11 cargoes, was 55.746 per cent. of iron. The indications from monthly samples of all the explorations in the Vinent group of mines indicates that the 2,500,000 tons of ore in sight will average 59 per cent. of iron.

Mining Methods.

The deposit is attacked by a series of levels from 40 to 60 ft. above one another, the stripping being kept well ahead of the mining operations proper. The configuration of the ground is such that the great amount of waste can be readily disposed of. Under some circumstances the ore is hoisted from lower to higher levels, for hauling to the main inclines, and in one case the ore and the waste are milled from an upper to a lower level.

The mining proper consists of drilling holes from 30 to 40 ft. deep, widening a chamber by some light charges and then loading with black powder. The larger boulders are shattered with dynamite. The waste is loaded with steam shovels and is carried to the dumps. The ore is conveyed to inclined planes, at the foot of which it is dropped into pockets, from which it is loaded into cars having a capacity of 25 tons on the standard gauge railroad which connects with the shipping harbor. This railroad, admirably ballasted and maintained, is 4 miles long and has a miximum grade of 2 per cent. It is equipped with four locomotives and 95 cars.

Transportation and Handling.

On the route to the shipping port the company has during the past year installed a crushing plant, consisting of a modern engine, two boilers and two No. 8 Gates crushers, with ample capacity to take care of the product of the mines, all of which goes through the crusher irrespective of size. The crushers deliver the ore into pockets, from which the cars are loaded. The empties are delivered to the crusher pockets and then to the storage tracks by gravity.

The company now has pockets and storage capacity in cars to accumulate about 10,000 tons, so that when an ore boat is to be loaded it can be done quickly. The pockets are now partially used to load the standard gauge cars with Berraco ores, which must first go through the crusher.

The company has just completed arrangements to stock a large quantity of ore on an extensive tract of level ground alongside the main line track. During the present depression shipments have been cut down to 15,000 tons per month, and about 15,000 tons per month will be stocked, so that the operations of the mines will

continue undisturbed. The normal production is about 40,000 tons per month.

The Harbor.

The harbor and its improvements are shown in the accompanying engraving. There is one low level dock, which is chiefly used for the tugboat Colon, belonging to the company, which is in service chiefly between Santiago and Daiquiri. The shipping dock was originally built with the intention of employing whalebacks, which the Standard Oil interests backing the mining enterprise at that time regarded as the coming type of carrier for bulk freight. The result was that the ore chutes were placed too low. Now two of the 10 pockets are so arranged that they will dischage when the vessel is high in the water, the balance of the cargo being loaded from the other pockets. The total capacity of the 10 pockets is 2500 tons.

In 1907 there were put through the storage pockets 155,825 tons, and there were put on a stockpile 43,900 tons, subsequently rehandled by steam shovel. Very rapid work has been done in the loading of vessels, the charges for demurrage being serious. In 1905 the average time of loading vessels, which averaged 4608 tons, was 25 hr. In 1906, when there were loaded 102 ships with an average cargo of 4966 tons, the average time was 20 hr. and 31 min. In 1907, with 98 cargoes of 4979 tons, the time was cut down to 17 hr. 27 min., or 285 tons per hour. A premium is paid to laborers for loading at a rate exceeding 200 tons per hour.

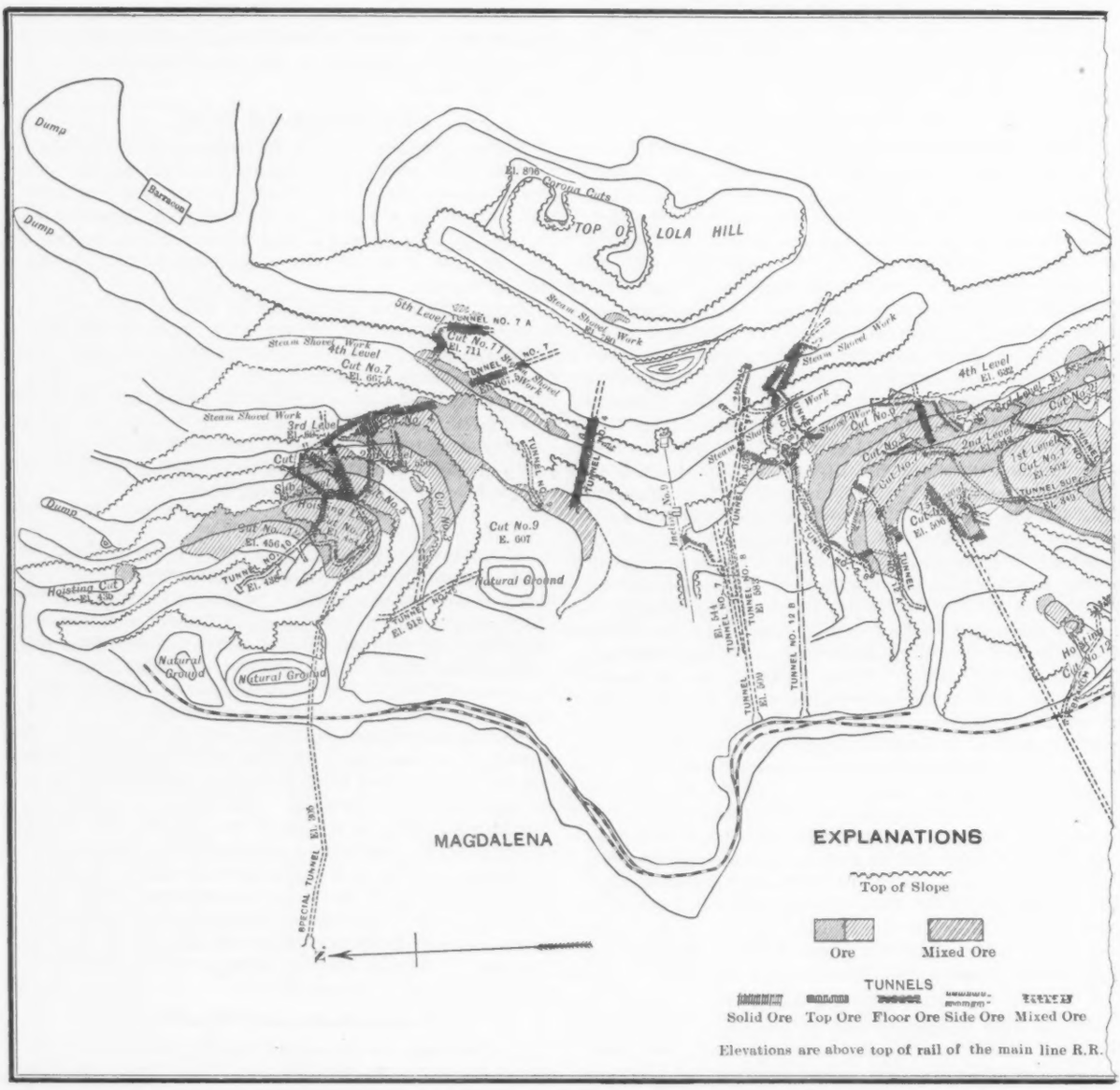
In close proximity to the dock are the machine shops and foundry of the company, in which repairs to plant and equipment are made, and the refrigerating plant, which is a necessary adjunct to every large plant in Cuba.

The Output.

Since May, 1895, the production of the mines of the Spanish-American Iron Company has been as follows:

	Tons.		Tons.
1895	74,991	1902	463,987
1896	114,110	1903	477,575
1897	206,029	1904	342,108
1898*	84,643	1905	422,003
1899	218,959	1906	510,500
1900	286,140	1907	500,330
1901	335,076		

* Interrupted by the war.



Map Showing the Magdalena, Lola and San Antonio Mines

The rapid development in the output has been largely due to the introduction of the steam shovel into mining at Daiquiri. The first steam shovel was brought in with great difficulty in April, 1900, a second being brought in during the same year. One more followed in 1901, two in 1905, one in 1906 and four in 1907. The majority of these are the Marion model 20, with 1¼-yd. dipper. This year the Marion model 50, with 2-yd. dipper, will be introduced. In February, 1908, seven shovels were engaged in stripping above the Lola and Magdalena mines, one was working in ore on the Lola proper and two were in ore in the San Antonio opening.

The Spanish-American Iron Company has a contract with the Earnline Steamship Company to ship the ores produced. The United States customs duty is 32 cents

per ton, being the duty of 40 cents per ton under the general tariff law, less 20 per cent. thereof under the preferential arrangement existing between the United States and Cuba. The ore is sold under a contract to the Maryland Steel Company and the Pennsylvania Steel Company, under which the price is close to that obtainable in the open market.

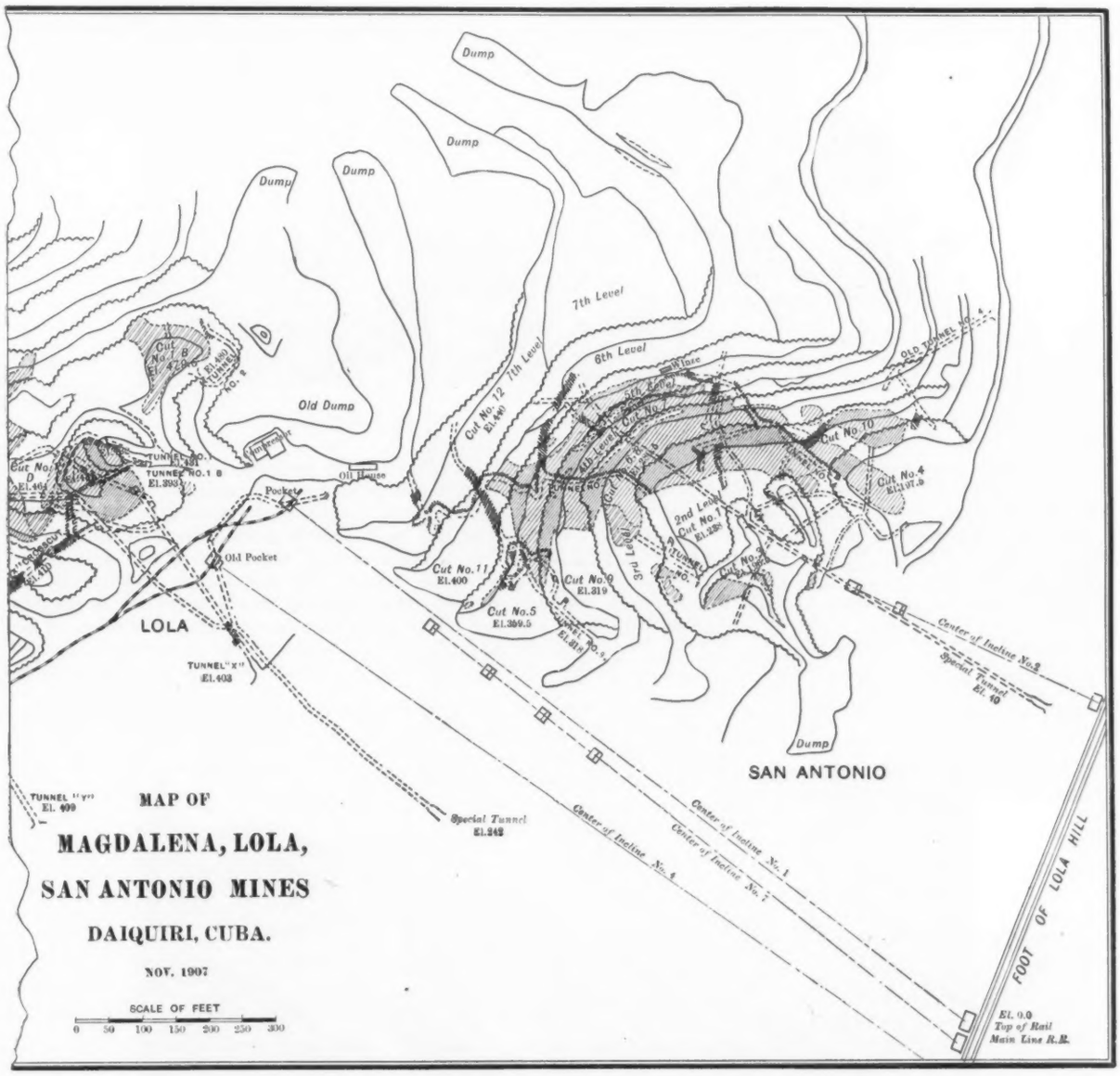
Sanitation and the Care of the Sick.

Close to the port, pleasantly situated on the brow of a low hill, is the hospital of the company. Very great attention has been given to the sanitary condition of the whole mining population. The guiding consideration throughout is that every effort must be bent toward the prevention of sickness and the spread of contagious diseases. The chief physician is at the head of an organized sanitary police, which subjects the dwellings of the workmen to frequent and searching inspection and is vigilant and unrelenting in demanding that precautionary measures be followed. All the buildings are spick and span, and there is no litter anywhere. The physician spends a considerable part of his time visiting the mines and watching the force, to prevent any attempts to disguise early symptoms of sickness.

The result has been a marked improvement in the health of the community. While in 1899 the average number of patients in the hospital each day was 6.7 in each 100 of the men on the pay roll, and was 5.9 in 1900, it dropped to 3.8 in 1901 and 3.2 in 1902, sank to 2.2 in 1903, fell to the record of 1.5 in 1904, with picked men, and has fluctuated between 1.8 and 2 since then.

In 1907, with an average of 1315 men on the pay roll, there were only 1034 patients in the hospital during the whole of the year. There were only eight deaths, and besides there were five deaths due to accidents at the mines caused by the negligence of the men themselves. Out of 808 cases of sickness 689 were malarial fever, of which 678 were cured. There were 215 cases of slight injury, of which 209 were cured, and 22 cases of heavy injury, of which 21 were cured.

The hospital itself is an airy, well designed building, well equipped with the necessary surgical implements and medicines, with broad verandas and a promising garden.



of the Spanish-American Iron Company, at Daiquiri, Cuba.

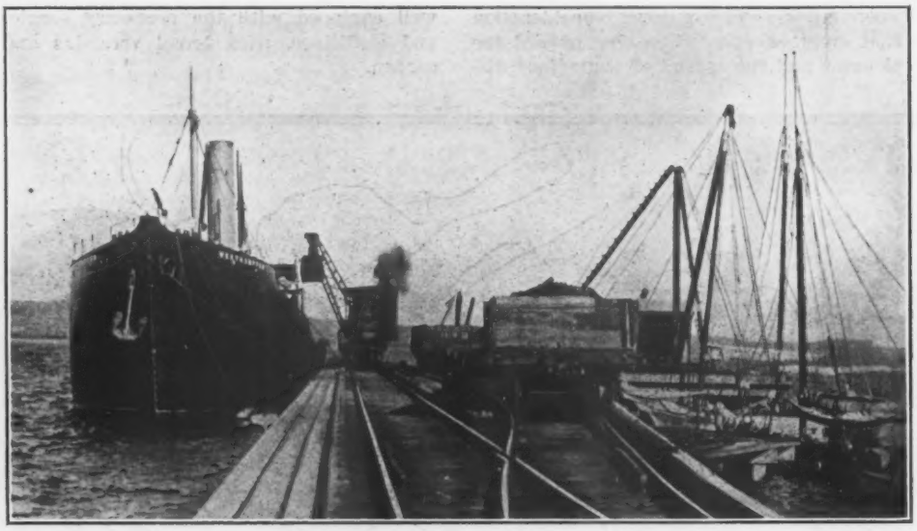
Mention may be made in this connection of the fact that the officers and principal employees enjoy one month's vacation every year, the cost of a visit to a northern climate being refunded to them. It has been the experience of all who work in tropical and semi-tropical climates that they must return to the north at regular intervals to escape the debilitating effects of sustained effort in the warmer countries.

THE MAYARI MINES.

The discovery of the Mayari deposit was not a lucky accident, but was the result of the work of an organization carefully planned, well manned and consistently supported. The Spanish-American Iron Company has for many years had its corps of expert explorers in the field in different parts of Cuba. Their long experience has

taught them how to meet more effectively the difficulties and lessen the hardships and risks of exploration in a tropical country. The attitude and method of the company has led to the practice throughout Cuba, on the part of prospectors and explorers, to bring their discoveries first to the attention of this company.

The first indication of the Mayari deposit, which was approached from the south flank of the Nipe range along an old highway which crosses the range, was the comparatively small bed of hardened ore which is found in



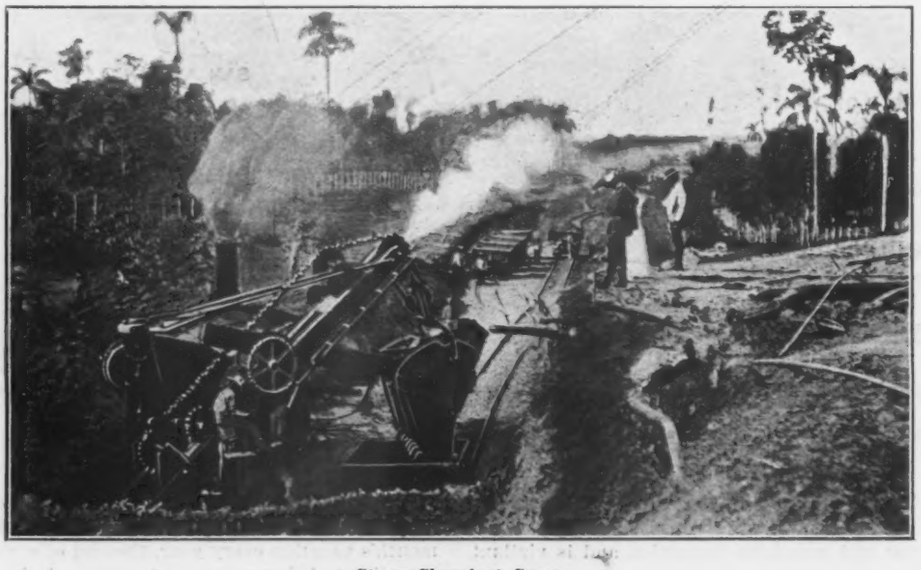
Coal Steamer, Brown Hoist and Sand Fleet at Felton.

some places, and notably the Plancha claim. With this cue, exploration was prosecuted and soon led to the discovery that there was a good deal of coarse loose ore which greatly expanded the possibilities. Later it was found that for its entire thickness the bed is iron ore, in spite of the yellowish colors of its deeper part. Test pitting was undertaken in a systematic manner, and the extraordinary extent of the bed became more and more apparent.

The total cost of the acquisition of the property, its exploration and development, including the building and equipment of the railroad and inclines, the dredging of the harbor, the construction of drying and clinkering plant, of ore loading apparatus, and the building of villages and shops at the mines and at the terminals, will aggregate about $4,500,000. The Spanish-American Iron Company has arranged an issue of bonds to meet this outlay.

The principal features of the Mayari district were fully and accurately described in the issue of *The Iron Age* of August 15, 1907, so that a brief summary of the principal facts will suffice with special reference to the present condition of the works for the development of the property.

The ore covers a plateau on the Nipe range, about 1800 ft. above the undulating plain which stretches to Nipe Bay. A number of routes were surveyed to overcome this rise, with special reference also to crossing the Mayari River at a point and a hight which would avoid the dangers of the floods to which the streams are subject. The route finally selected, while more costly than others rejected, is secure from floods. Between Felton, the terminal established on Cagimaya Island, on Nipe Bay, and the main switching yards at Piedra Gorda, at the foot of the mountain, a distance of 13.5 miles, there are five steel bridges and one wooden trestle. All the bridge material is delivered and is in process of erection. The greatest delay which has occurred thus far is in the Guaya cut, through unseasonable rains. This is now nearly completed, and track laying will follow quickly.



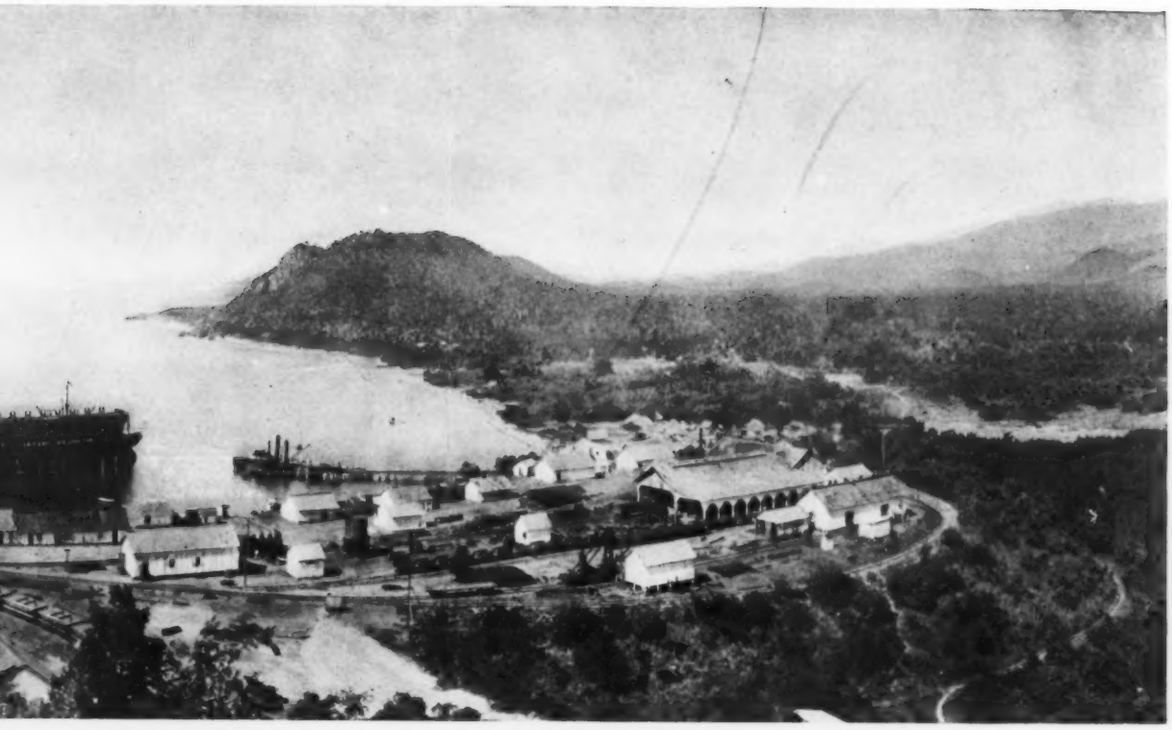
Steam Shovel at Guayo.

The mountain top is reached by two inclines, the upper 6957 ft. long and the lower 1876 ft. long, connected with 4071 ft. of level track. The grading of the lower incline has been completed, and the contractors were recently putting in the cableway for carrying on the work. From the head of the upper incline a mine railroad is planned, to be 3 miles long, to give room for five steam shovel tracks. The incline machinery, which has been designed by the New York Cableway & Engineering Company, New York, and under construction by the Nordberg Mfg. Com-

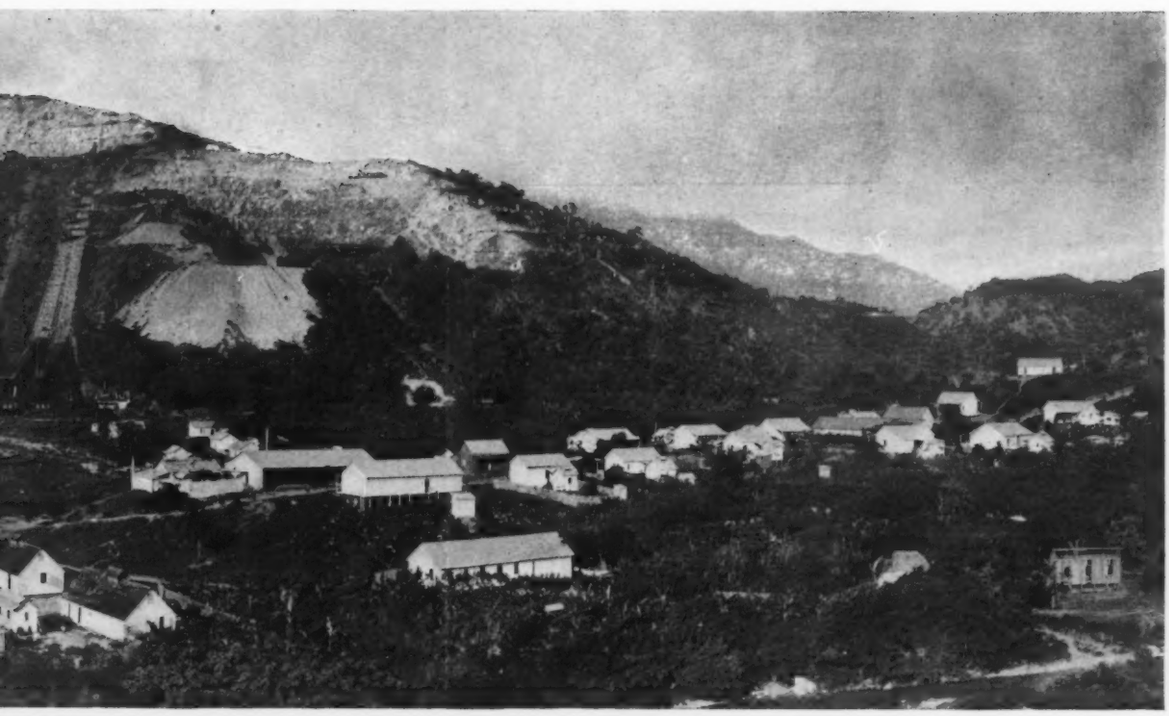
THE SHIPI

LOLA HILL AND A PART O

THE IRON MINES OF
AT DAI



E SHIPPING PORT OF THE SPANISH AMERICAN COMPANY'S IRON MINES



PART OF THE TOWN OF DAIQUIRI, WITH THE SAN ANTONIO MINE ON THE RIGHT OF THE INCLINES AND THE LOLA MINE ON THE LEFT

S OF THE SPANISH AMERICAN IRON COMPANY
DAIQUIRI, NEAR SANTIAGO, CUBA

[OVER]

THE MAGDALENA MINE

THE LOLA MINE

THE SAN ANTONIO IRON MINE

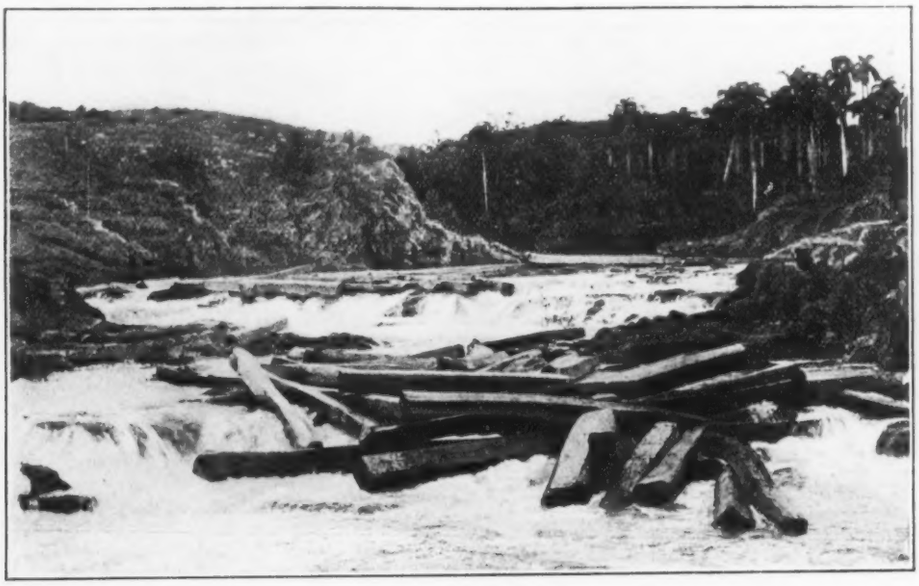
THE IRON MINES OF THE SPANISH AMERICAN IR
AT DAIQUIRI, NEAR SANTIAGO, CUBA

IRON COMPANY
BA

pany, Milwaukee, will at first have a capacity of 6000 to 8000 tons in 10 hr. It will be so arranged that it can handle three 50-ton cars when using a larger rope. At first, with a smaller rope, it will handle only two cars. Later, when necessary, the capacity can be further increased by dividing the upper incline at a point half way down, where the grade is reduced to 5 per cent., thus making three inclines.

of the basin was moved out about 245 ft. from the shore line. There will be 28 ft. of water for 1500 ft. along the shore available for handling ore, coal and lumber.

At Felton the ore from the mines will be dried and clinkered. A special car has been designed to handle the sticky ore, which will be either fed directly into the drying and clinkering furnaces or delivered to storage. A long series of experiments led to the final selection of the type of plant for drying the ore and clinkering it. The initial layout at Felton provides for six clinkering furnaces, having a total capacity of 3000 tons of calcined ore daily. From these drying and clinkering furnaces the ore is discharged into transfer cars. The run on the wall of a long trough, lined with concrete and located parallel with the shore line. From this trough the ore is lifted by a grab bucket on a trolley, moving on a bridge with a cantilever overhang and a knife arm reaching out from the end of the cantilever over the vessel to be loaded. The ore may be loaded by the bridge from the trough to vessels or to a stockpit, as occasion requires. It is claimed that the machinery can load from the trough to a vessel at the rate of 600 to 1000 tons of clinkered ore per hour.



Mayari Falls, Mayari River.

The Terminal.

At the terminal, Felton, a great deal of work has been accomplished. A pier 1700 ft. long has been in use for a considerable time, there being enough water at the last 200 ft. for ocean going vessels. It has been used steadily for bringing in track materials, supplies and fuel, a Brown locomotive crane having been found a very useful tool in connection with it. By far the greater part of the 3000 ft. of channel from the shore of Cagimaya Island to the main ship channel has been dredged to a width of over 200 ft. and to a minimum depth of 28 ft. This work was decided upon after the question had been carefully considered of building a pier 3000 ft. long from the shore to deep water. It was ascertained, however, that the foundations were too poor to permit this to be done, and the plan was adopted of dredging the channel to the shore and excavating a basin along the shore for loading. Drillings showed that there was a considerable yardage of rock close to the natural shore, and therefore the rear edge

South Abutment, Mayari River Bridge.

The presence of chrome in pig iron has been a perplexing matter to steel makers, chiefly because chrome slags are infusible and sticky and are troublesome either in the Bessemer converter or in the open hearth furnace.

Very extensive tests have been carried out in the acid and basic Bessemer converter and open-hearth furnaces at the Pennsylvania Steel Company which led to a successful issue, the metallurgical considerations being determined which should guide in the conversion of pig high in chromium. As yet the details are not available for publication beyond the fact that the steel produced has been of very high quality.

At Felton a machine and repair shop have been installed, together with a woodworking shop. A warehouse is under construction, and a considerable number of workmen's houses and barracks and of officers' houses have been completed together with a roomy hotel. The village has been laid out in accordance with the plans of Hinchman, Pilat & Tooker, New York, with sewerage and water supply complete. It is located on Cagimaya Island, facing the bay, on ground considerably above the sea, and promises to be thoroughly healthful and pleasant. For the permanent water supply a plant has been provided capable of furnishing 300,000 gal. per day, the water being taken from the Mayari River at an advantageous point, where the railroad line crosses that stream. The water, which is of remarkable purity and softness, is elevated by steam pumps to tanks on a hill, and flows through an 8-in. cast iron pipe by gravity 12 miles to Felton. A second village will be built at the mines.

It is expected that in the first year when the entire operations swing into line the shipments will amount to 500,000 tons, and that the second year, 1910, will see them carried up to 1,000,000 tons of clinkered shipping ore.

THE MOA DEPOSIT.

The Moa deposit, almost all of which is owned by the Spanish-American Iron Company, is located 45 miles east of Nipe Bay. It is larger in extent than the Mayari, but has some leaner spots. While it is quite close to the sea and might have been opened at somewhat less cost than Mayari, it was evident that the operating costs would be higher. The harbor is also inferior. Until after the Mayari properties have reached their maximum shipping capacity, it does not seem probable that any development will be undertaken at Moa. The deposit is located in a country which is very sparsely populated, while the Mayari mines are close to a district which has a relatively large population, the town itself having upward of 3000 souls, cultivating extensive tobacco fields. On and adjacent to Nipe Bay are the sugar plantations of the United Fruit Company, with upward of 25,000 acres in cultivation, and one of the largest sugar mills in Cuba, having a capacity of 2000 bags per day, and a lay out for 1000 bags additional, located at Preston, the terminal, with ample docks and dwellings. On Nipe Bay also is Antilla, the terminal of the Van Horn railroad enterprise, while the large fruit plantations of Dumois are at Saetia, close to the entrance to the sea. The Mayari enterprise is therefore established in a well settled country, with ample opportunity to furnish the needed supply of labor, of which a comparatively small proportion will be skilled.

PROPERTIES OF THE PONUPO MANGANESE COMPANY.

The first discovery of manganese ore at Ponupo, Cuba, was on Vencedora hill, the deposits possessing the irregularity which seems to characterize all manganese de-

Incline No. 1, from Station 125.

posits, the world over. The ore is in the form of pyrolusite, and is in irregular though often very considerable bodies, and mixed, often, with clay and with jasper. In the earlier days of mining at Ponupo the jasper was considered to be an indication that no further ore would be found below it. That idea has now been completely abandoned.

Incline No. 2.

The ore is worked in open cuts and is separated into two classes, the shipping ore and the wash ore. In

recent years a great deal of systematic exploration has been carried out, and the mine tracks have been extended to the Balkanes mines, which were opened and were ready to ship when the decline in the demand for manganese ore following the recent financial panic led to the closing down of the Ponupo manganese mines for the time being.

The wash ore is brought to barrel washers, placed side by side, driven by an engine. The water is supplied by a pumping station located on the Ponupo River, from which it is pumped to tanks placed 180 ft. above them. The wash water is allowed to settle in reservoirs formed by throwing up dams along the side of the hill. A considerable amount of wash has thus accumulated which contains about 20 per cent. of manganese and a like amount of silica. Experiments have been made to utilize this material with the aid of a vanner, but they have not yet been successful. The main incline serves a series of levels for delivering ore to the bin, which is located on the main line. A new bin for direct shipments has just been completed.

During the period in which the present management conducted active operations, from March, 1906, to September, 1907, the mine produced about 50,000 tons. The mines have employed up to 400 men. A considerable share of the output is made by contractors who employ small crews of men on the many small and isolated deposits. They are paid a fixed price for clean ore, alongside the track of the railroad, based upon analysis of an average sample. A considerable number of the working population are negroes.

The Ponupo shipping ore runs about 42 per cent. of manganese, 0.08 per cent. of phosphorus, 11 per cent. of silica, and 6 per cent. of iron, in the dried ore. The hygroscopic water is about 10 per cent. Cargo analyses show shipments up to 46 per cent. of manganese.

While the mines were in operation they shipped up to 4000 tons of ore per month, while the capacity of the leased operations was about 600 to 700 tons per month additional. Of the shipments made, three averaging 2500 tons each were made to Europe, the balance coming to the United States.

The distance from the mines to the coast is 22 miles, the freight being $1.45 to $1.50 per ton, alongside the ship's tackle. The royalty is usually 80 cents per ton, but is lowered to about 50 cents when shipments go above 10,000 tons in one year. The ocean freight is about $1.60 per ton.

The Cuero Iron Mine.

The Ponupo Manganese Company, which is owned by Charles F. Rand, Jennings S. Cox, Jr., and Pedro Aguilera, has recently begun the opening of an iron ore deposit at El Cuero, close to the coast, 8 miles west of Santiago. This property is expected to begin shipping about 10,000 tons of iron ore per month in November, 1908. The character of the ore is like that of the Daiquiri mines, and is expected to run in cargo lots 60 per cent. of iron, 0.03 per cent. of phosphorus, 8 per cent. of silica, and 0.02 per cent. of sulphur. A railroad line, 2.8 miles in length is being built. The loading point will be in the Bay of Nima Nima, where the wreck of the Spanish warship Oquendo lies.

The Future of Cuba and American Interests.

A brief sojourn makes it a hazardous undertaking to touch upon the all absorbing question of the political future of Cuba, and of her relations to the United States, but the latter have assumed increased importance through the very discovery of the new iron ore mining fields. They will become a main source of supply to one of our great foundation industries so that another tie is being formed in the economic interdependence of the two countries, and our interest in a stable, well managed government for the Pearl of the Antilles is increased.

The opinion seems to be prevalent in this country that Cuba owes us a great debt of gratitude for having aided in securing her independence and for having introduced and maintained an orderly government. However much or little this feeling may be justified is really beside the question, since the practical point is whether the majority of the Cubans share in that sentiment. It is the opinion of clear sighted observers that they do not, and that, in fact, they are impatient of control and eager to manage their affairs in their own way. The "American" is not, on the whole, more popular in Cuba than he is in Mexico, or any other Spanish-American country. His money is very, very welcome. His energy is more envied and resented than it is admired. The better, wealthier, ambitious classes, who have a stake in the country, realize that they must share in the well being which an influx of capital and enterprise has already brought to the country and will bring in to an increasing measure. While they should be the ruling class, they are not because too many of them have been identified with Spanish interests or are themselves natives of Spain. The mass of the people, and particularly the laborers, have been greatly benefited by the higher level of wages established, but they are easily led by agitators, and they do not like the "Americans," whose attitude, manners and methods are very far from being sympathetic.

It is difficult to escape the conviction that in Cuba it is a matter of the "ins" and the "outs," rather than one of fundamental principles. The future would be clearer, if the people were more eagerly and more intelligently given to promoting their own material interests by sustained effort. Enlarged opportunities and the example of success may be depended upon to stimulate this feeling, but its growth can not help being gradual at best.

The Cuban people should be assisted and given the greatest possible latitude and a fixed policy should be pursued which will assure peace and the undisturbed development of great material resources, in which American capital has so large a stake. That our own country will protect those investments is accepted as an axiom.

The Pennsylvania State Railroad Commission.

HARRISBURG, PA., April 7, 1908.—The new Pennsylvania State Railroad Commission this week begins its hearing of complaints, first taking up that of the York Manufacturers' Association against the Northern Central and Western Maryland railroads. The complaint involves switching charges. Over two dozen formal complaints have been filed with the commission, mostly on insufficient train service and switching, there being none of discrimination or lack of car service. The commission has large powers of inquiry and can recommend prosecution by the Attorney-General if its orders are not complied with. The work under the commission is to be divided among bureaus, as follows: Bureau of accidents, to have charge of the investigation of all accidents; bureau of railroad inspection, to have charge of the inspection of roads, grade crossings, safety appliances, and all other physical features of steam railroads; bureau of street railroad inspection, also to have charge of the inspection of telephone and telegraph equipments and facilities; bureau of traffic, to have charge of all matters relating to rates, service, &c.; bureau of statistics, to collect and compile statistics.

The members of the commission are as follows: Judge Nathaniel Ewing, Uniontown, president; Charles N. Mann, Philadelphia, and John Y. Boyd, Harrisburg. Harry S. Calvert, Pittsburgh, is secretary; William H. Allen, Warren, is attorney, and John P. Dohoney, Harrisburg, is marshal.

This commission has jurisdiction over approximately 1700 corporations. These include 509 steam railroads, 710 electric railroads, 350 telephone companies and the various telegraph, express, pipe line, fast freight, steamboat, ferry and bridge companies. Its jurisdiction covers more than any other State Railroad Commission or similar body in the United States.

The Commonwealth Steel Company, Granite City, Ill., after a month of idleness, has resumed work in its open hearth steel casting plant, employing about 400 men. Under normal conditions more than double this number is employed, and it is expected that the improvement in business will within a short time increase the force materially.

The New Blast Furnace of the Hamilton Steel & Iron Company, Ltd.

Hamilton, Ont., has been for a number of years the location of an important factor in Canadian iron and steel manufacture. In the beginning a rolling mill plant was built there in 1861, which has turned out a variety of products, principally bar iron, fish plates, nail plate, cut nails and rivets. In 1894-1895 a blast furnace was erected at Hamilton, operated for a time by the Hamilton Iron & Steel Company, Ltd., and later by the Hamilton Blast Furnace Company, Ltd. Various extensions to the rolling mill plant have been made from time to time, including in recent years an open hearth plant, and the larger development led in 1899 to the organization of the Hamilton Steel & Iron Company, Ltd., which has operated the blast furnace and mills with continued success. The steel works embrace four 30-ton open hearth furnaces, and the rolling mill department consists of the following: One 20-in. bar, one 20-in. plate, two 14-in. trains, two 10-in. trains, one 9-in. train, four busheling furnaces, four double puddling furnaces and nine heating furnaces. The forge plant is provided with four steam hammers, lathes, &c. Including the new blast furnace referred to below, the capacity of the plant per annum is as follows: 180,000 gross tons of pig iron, 100,000 net tons of steel ingots and 90,000 to 100,000 net tons of rolled iron and steel, besides forgings, steam and electric railroad axles and track spikes.

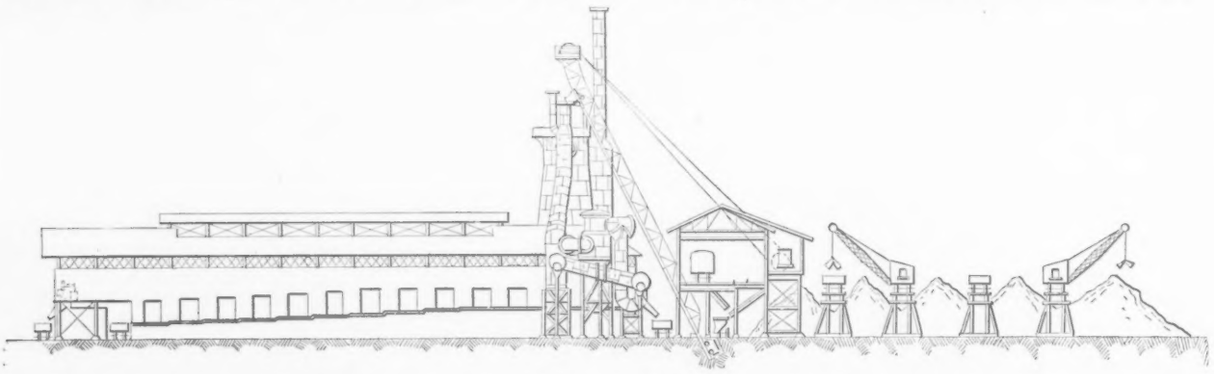


Fig. 1.—Elevation, Part in Section, of Ore Stock Piles, Bins, Blast Furnace and Cast House of the Hamilton Steel & Iron Company, Hamilton, Ontario.

With increasing demands for pig iron, both for its own consumption and the requirements of the merchant trade, it became necessary for the company to build an additional blast furnace plant, which was placed in operation in November, 1907. It is located adjacent to the original furnace. Fig. 1 shows the elevation of the furnace, bins, ore yard, &c., while Fig. 2 is a front elevation of the two furnaces and their stoves. The blast furnaces are located in the outskirts of Hamilton, on the shore of Hamilton Bay and Lake Ontario.

Ore Storage Yard and Bin System.

Owing to local conditions it is advantageous to deliver raw materials by rail rather than by water. While the plant has been designed to meet this requirement, the possibility of water delivery has been borne in mind and provision made therefor. The advantage in cost of production arising from the ability to unload and store the winter's ore supply in summer are of unusual importance at Hamilton, and as a consequence an ore storage yard is provided of ample capacity. This consists of a series of trestles, the ore being unloaded from the railroad cars and stored between and below the trestles by "whirly" cranes equipped with grab buckets. These cranes are also used to lift the ore from the storage piles and deliver it into drop bottom cars, which are in turn transferred over and discharged into the stock bins. The stock bins are constructed of steel, the bottoms and sides being yellow pine plank. The interior surfaces are lined with maple. The bins are of the double type, with a railroad track located over each row. Those on the furnace side are devoted to coke, limestone and special ores, while those on the opposite side are reserved for the main ore supply. During the open season the major portion of the current ore supply is delivered direct to the bins, while at the same time ore for winter use is being unloaded and stored in the ore yard.

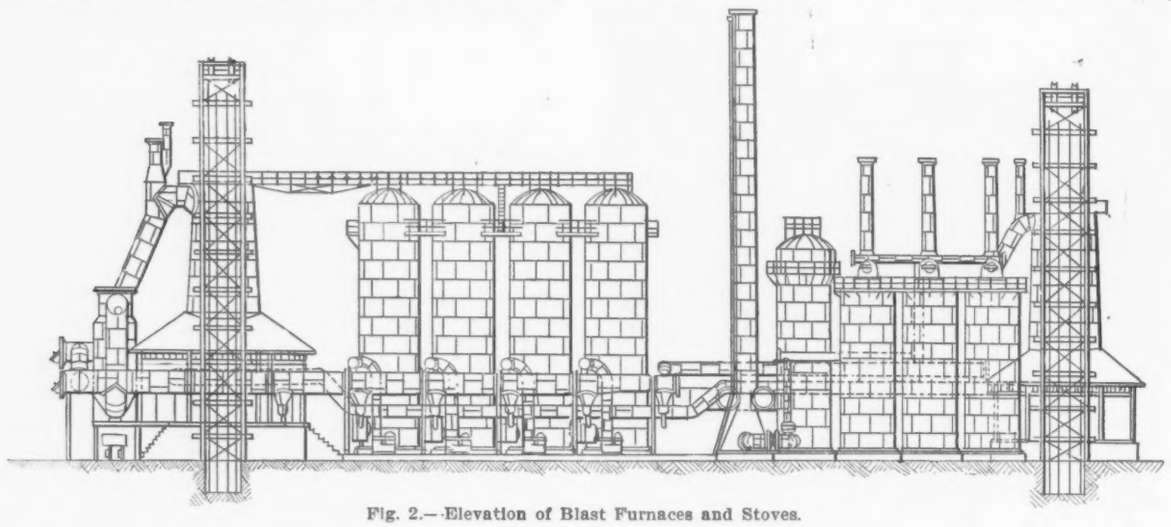


Fig. 2.—Elevation of Blast Furnaces and Stoves.

The coke bins discharge directly into the furnace skip car, by means of a chute equipped with a screen. The ore and limestone are transferred from the bins to the skip car by an electrically operated transfer scale car. The stock bin gates are of the pivoted type, arranged to be operated by a lever carried by the transfer car, thus avoiding the expense and complication of a separate operating apparatus for each car.

The Blast Furnaces and Equipment.

The original furnace, known as A, is 75 ft. 6 in. in hight, with a bosh diameter of 16 ft. and a hearth diameter of 10 ft. 3 in. The furnace is at present equipped with a vertical hoist and all stock is handled

in barrows. The stove plant consists of three Gordon chimney top stoves and one Cowper-Roberts stove. Plans are about completed for the complete reconstruction of Furnace A and its equipment. The new furnace, known as B, is 80 ft. high, with a bosh diameter of 20 ft. and a hearth diameter of 13 ft. 6 in. It embraces the modern construction of a steel shell carried on cast iron columns, and is furnished with bronze bosh cooling plates of the Scott design and a wrought steel hearth jacket. This furnace is provided with a double skip hoist and a charging apparatus of the Roberts revolving type. The hoisting equipment consists of a Crane steam engine. The starting lever for the hoist engine, the control of the bell cylinders, the bell indicators and the furnace

Fig. 3.—View of the New Blast Furnace, with Centrifugal Dust Collector.

sounding apparatus are all located in the stock house at the foot of the skip hoist and are under the control of one man. The fire brick stove plant embraces three Cowper-Roberts stoves, 21 ft. in diameter and 90 ft. in hight, the intention being to add a fourth stove of the same type in the near future.

The downcomer is connected to the furnace at one point, the downcomer as well as the furnace being provided with suitable relief valves. A dust catcher is located at the foot of the downcomer, with a connection leading therefrom to a centrifugal dust collector of the Roberts type, described in *The Iron Age*, of May 9, 1907, page 1414. A by-pass gas connection is also provided around the dust collector. The gas main is equipped with a series of pockets, closed by counterweighted bells and discharging into spouts, which in turn deliver the dust into railroad cars. Fig. 3 shows the arrangement of downcomer, dust catcher and centrifugal dust collector.

The casting house is 55 ft. in width by 235 ft. long, and consists of a steel frame building covered with galvanized corrugated iron and arranged with sliding doors to close all side openings. The furnace and pig bed levels are placed high enough above the yard level to permit the use of ladles for both cinder and metal. The pig bed retaining wall is shown in Fig. 1.

A pig breaking equipment manufactured by the Brown Hoisting Machinery Company, Cleveland, Ohio, is located at the top of the casting house, the roof of the latter extending over the breaker. An electric crane traverses the casting house and carries the pig combs to the breaker. Two railroad tracks are provided in connection with the breaker, one on the outside and one between the breaker and the pig bed.

Power Plant.

The boiler plant is common to both furnaces and consists of 3200 hp. of Stirling boilers and 400 hp. of Babcock & Wilcox boilers. All boilers are arranged to permit both gas and coal firing and are furnished with independent chimneys. The steam piping system embraces a header over the boilers, with lines leading to steam receivers in the engine house, from which distribution is made. The boiler house is a brick building.

The engine house is common to both furnaces, and the blowing engine equipment consists of two Gordon engines, 42 in. and 84 in. by 60 in.; one Laurie engine, 42 in. and 84 in. by 60 in., and two Tod engines arranged to operate compound, the high pressure steam cylinder being 42 in. in diameter and the low pressure cylinder 82 in. in diameter, while the air cylinders are 84 in. in diameter by 60-in. stroke. A sixth engine will be installed before the improvements are completed. The pumping plant consists of direct acting plunger and electrical turbine pumps, having a total capacity of 12,000,000 gal. in 24 hr. The electric generating plant consists of three units, having a total capacity to meet the ordinary requirements of the plant.

In determining the location and design of the new furnace plant it was the aim of the management and the engineers to construct a works which, in conjunction with the original furnace and the improvements thereto, would form a well balanced furnace plant, and in which the power equipment, the fuel and labor saving devices as a whole would result in general efficiency and economical operation. The operation of the plant for several months has demonstrated that these objects have been successfully accomplished. The plant was built under the designs and supervision of Frank C. Roberts & Co., Philadelphia.

The directors of the Hamilton Steel & Iron Company, Ltd., are Charles S. Wilcox, Robert Hobson, Charles E. Doolittle, William Southam, George Lynch Staunton, K.C., John Milne, A. E. Carpenter. Charles S. Wilcox is president; Robert Hobson, vice-president and general manager; H. H. Champ, secretary and treasurer; D. D. O'Connor, sales manager; Charles A. Grimes, superintendent of furnaces; F. B. McKune, superintendent of steel works, and George L. Drew, general superintendent.

The S. Obermayer Company, Cincinnati, Ohio, has opened a warehouse at 1604 North Broadway, St. Louis, Mo., with C. M. Barker, one of the best known foundry supply men in the West, in charge. Mr. Barker, as representative of the company, has occupied offices in the Roe Building for a number of years, and the company, on account of the ever increasing demand for its goods, has found it necessary to carry a large stock of foundry facings and supplies to supply the immediate needs of the foundries in and adjacent to St. Louis at a more accessible location. The S. Obermayer Company now has factories and warehouses located as follows: Cincinnati, 647 Evans street; Chicago, Eighteenth and Rockwell streets; Pittsburgh, Thirty-fifth and Charlotte streets; Philadelphia, 2514 Aspen street; St. Louis, 1604 North Broadway; Cleveland, 6305 Euclid avenue; Denver, 305 Appel Building and 620 Nineteenth street; Kansas City, Massachusetts Building; Milwaukee, 696 Prospect avenue; Troy, Campbell's highway and Thomas street.

Trade Syndicates Growing in Germany.

The annual report of the Berlin Chamber of Commerce refers to the rapid increase in the number of trade syndicates in all branches of business in 1907. In fact, the entire report of this foremost commercial body in Europe is devoted to the subject of commercial trusts, so called. A long list of active kartells, or syndicates, is given, and it is stated that a good many others exist. The report says that all have a common feature in their constitutions—the endeavor to improve the position of their members by strengthening relations with their customers, and by customers the middlemen are meant. The agreements all aim at unity of sale price. When the quality and price of an article differ with different manufacturers, the agreement aims at other commercial conditions which, though less important than price, may be improved by co-operation. For instance, deliveries, methods of payment, discounts, free delivery of samples, taking back unsold goods and other such matters are subject to agreement. Very often agreements as to price are supplemented by understandings as to sales conditions. Some of these do not aim at fixing a minimum sale price, but reach the end indirectly by restricting competition in the district or by regulating the output. If a retailer sells an article below the syndicated price no other goods manufactured by the syndicate are sold him.

The kartells act powerfully in bringing non-syndicated industries under a similar system. In some cases the less profitable types of business trusts have been gradually eliminated, and in others an indirect but very effective pressure is exerted. Customers are bound to pay their debts to syndicate members within a strictly limited period, so that they have very little cash left at their disposal for their non-syndicated creditors. The latter have to wait a considerable time for their money, and end up by organizing kartells on their own account. The report also says that numerous associations have been formed to secure for members the advantages of buying on wholesale terms; they are largely composed of employees and officials of public and private institutions.

At first these trade organizations were looked upon in Germany as a sort of noxious excresence upon the commercial body, which it was the Government's duty to suppress. But to-day public opinion has become used to them and sees nothing amiss in their development. The principal grievances brought against the kartells are summarized as follows: Concerning price policy, those dealing with raw materials and semi-manufactured products are constantly accused of putting difficulties in the way of exporting German manufactured products, because they sell more cheaply abroad than at home. Complaints are also made that the kartells raise or lower the price suddenly without giving any warning, while with free competition such changes only take place gradually. It is stated further that the influence of a single governing body on a whole syndicated product has a very bad effect upon its manufacture from the technical point of view. Customers often receive quite other manufactured goods than those they ordered and often are compelled to accept brands different from what they ordered, merely to "keep in" with the governing body of the kartell.

The Asbestos Protected Metal Company, Canton, Mass., has recently issued a pamphlet giving particulars of its products. The company's principal output is asbestos protected metal. This material is becoming well known to the building trade, large quantities of it now being in use in a wide variety of service. The asbestos protected metal is especially valuable for roofing and sheathing buildings where severe acid fume, steam and rust resisting properties are required. In addition to the flat and corrugated roofing sheets which the company originally manufactured, several new forms have been added, including curved corrugated sheets, beaded siding, standing seam roofing, ridge capping, flashings and other specialties for the general covering of buildings of all classes. The company is also manufacturing the Robertson standard box car roof, a patented construction, which has been in use for some time on the Intercolonial Railway of Canada. It is now being introduced in this country. The company reports not only a heavy demand for its products but bright prospects for an active season.

Progress in Cornell Engineering Courses.

The annual circular letter to the alumni of Sibley College, Cornell University, gives interesting information concerning developments in the work of the various departments. The machine design and machine construction departments have been consolidated, and in connection with the machine shop work a course of lectures on the principles of manufacturing has been added. In line with the policy of the last few years greater effort has been made in the shops to approach the conditions of regular manufacturing practice. The foundry is now teaching the advantages of molding machines for duplicate castings, and the blacksmith shop the advantages of machine methods over hand work. More and more the lines are being drawn between the purpose of a trade school and that of an engineering school. Sibley College is of the latter class, and holds to the belief that the shop should aim to make the student resourceful in ideas rather than skillful as an artisan.

The experimental engineering department now provides a junior electrical laboratory, for performing elementary exercises in the third year, and the new refrigerating testing plant is probably the most complete ever put in an educational institution. Four courses have been established in gas engineering: one of lectures on the general theory of gas engines, another on gas engine design, a drafting room course in gas engine design and a lecture course which treats of the engineering problems involved in the conversion of various solids and liquid fuels into gas fuels and in the transmission of gas fuels. The gas engine laboratory has been established in a building of its own of fireproof construction and its equipment is unusually complete.

The electrical engineering courses have been improved and modified to make the work of mechanical and electrical engineers the same up to the close of the junior year, desirably postponing the time when a student must decide in which he will specialize. Last year there were more than ever graduated in the course of naval architecture and this year the registration in the railway mechanical engineering course was the largest to date. The co-operation of the department of mechanical engineering with that of experimental hydraulics conducted by the College of Civil Engineering for the experimental work is reported very successful. In the marine engineering course special attention has been given to steam turbine design. All of the shops and laboratories have had accessions to their equipment.

The Arrangement and Construction of a Modern Manufacturing Plant.

A paper on the above subject illustrated with stereopticon views was presented recently before the Brooklyn Engineers' Club by Thomas C. Flinn of the Kennedy Valve Mfg. Company, Elmira, N. Y. It describes a unique way of developing a manufacturing plant. The company's works at Coxsackie, N. Y., being unequal in producing capacity to the company's requirements, a new plant was projected, and instead of seeking for a site in the vicinity the company first decided on the size and shape of the plot it would require and then sought within a radius of 500 miles for the place that would afford such a site. The machines necessary, represented by scaler templets, were grouped in plans, as required for economical production, and the buildings drawn around them. Then these buildings were put together in the most advantageous way which determined the shape or the plan of the complete plant. Elmira afforded the site required and offered excellent shipping facilities and hence was decided upon. The detailed description of the engineering work, with illustrations of the plant in course of construction, has been reprinted by the Kennedy Valve Mfg. Company, and will be sent to any interested.

An Important Lake Ore Deal Reported.

DULUTH, MINN., April 4, 1908.—There are rumors of the progress of negotiation of a deal for the purchase of the properties of the largest independent ore mining firm by the Oliver Iron Mining Company. How authentic these rumors are cannot be determined here, but it need astonish no one if they should in time prove correct. The firm in question, Corrigan, McKinney & Co., owns and operates important mines on every lake range but the Marquette and Vermillion, and holds properties on the first named of these two. Its shipments the past year were in the neighborhood of 2,500,000 tons, and this amount could be easily increased. It has several Mesaba and Menominee properties that have been under heavy expense for development of late, and that are most excellent in every way. This firm is especially strong on the Menominee range, where it has been gathering in properties since the panic of 1893. Its lands on the Menominee contain immense bodies of soft ores characteristic of the region, and its mines are opened on broad and able lines, well and carefully.

In the Crystal Falls District of the Menominee Corrigan, McKinney & Co. control the Crystal Falls, Lincoln, Lemont, Tobin, Armenia, Dunn, Fairbanks, Great Western and Quinnesec, as well as several operations that are proving into mines and have much promise. Of all these the Tobin is perhaps the most important, so far as present developments indicate. Its ore averages nearly 59 per cent., and, like most of the Menominee propertis, is non-Bessemer. On the Gogebic range the firm owns the Colby, Ironton and Winona. It is developing these extensively, and has been amply rewarded the past year by important developments at depth. On the Cascade section of the Marquette District it has the Star West and other idle properties, containing large tonnages of rather lean siliceous ores. On the Mesaba it is operating the Stevenson, Jordan, Commodore, St. Paul and St. James. The latter is a new development on the eastern Mesaba, and has as yet shipped no ore. Its Stevenson is an immense open pit property, which has reached a production of more than 1,600,000 tons in a single season. This property has been extensively stripped the past season and the extent of the ore body is now known to be greater than before supposed probable. These Mesaba properties are standard Bessemer mines of excellent character, and all can be mined at low costs; with the exception of St. Paul and St. James they are open pits. The Stevenson is credited by the State Tax Commission with a reserve of 2,500,000 tons, but it is probably somewhat in excess of that.

The Oliver Company's Operations.

The Oliver Iron Mining Company is commencing stripping operations on the Leonard mine, taken over in its Great Northern ore deal. This property had been a considerable shipper before the purchase, but the pit is in such condition that it is questionable if the company mines any ore there this season. The pit is restricted in size and is quite deep. A large amount of stripping will be necessary to make it an economical mine.

The Oliver Company is now hoisting from its McKinley mine, which has been under development for some time. This ore is coming out of development work, and when spring opens the pit will be mined. For some time, however, the main operation at this mine will be in opening drifts for handling ore to the shaft, under the pit that steam shovels have for some time been opening. The company is at work grading the site of the new village of Sparta, which is to be moved from its present location on account of the discovery of a large mine beneath it. After the site is filled and settled the company will move buildings, open streets and make other improvements at its own expense, to fit the place for comfortable residence.

The same company has just completed a fine steel shafthouse at its Prince of Wales mine, Negaunee, and the property, with this and other betterments put in during the winter, is in shape for a much more important production than it has yet reached.

Ore Railroads Looking for Light Traffic.

Significant of the ore shipping season are notices that have been sent out to employees by the three iron ore railroads centering at Duluth. Most of the skilled men employed by these railroads go to other parts of the country during the winter and return here in April for the ore season. Within the past day or two the roads have sent these men notices to the effect that they need not report for work until after June 1, the idea being that they may remain at work where they are as late as possible, the roads having no doubt that their regular train crews will be ample to handle all ore traffic up to, say, about June 15. The customary date for the commencement of ore movement on some scale is about April 15, or, as last year, even earlier than that.

No advices have been received from mine managements here as to the schedule of operation for the year, even the Steel Corporation being unwilling to set any figure for the guidance of mine operators. The most that can be learned is "you may figure about 60 per cent. of last year, and we will see later how much that will be cut." Surely this is not a very encouraging estimate. But the general feeling her is that, as has happened in such times before, the season will open late, but that it will end in a rush to get down ore. This will, to be sure, be modified this season by the fact that there is so much ore on hand below that the rush may not take place.

D. E. W.

The Exposition of Safety Devices.

Lighted lamps that will not explode when turned upside down, containers through which lighted gasoline can be poured without exploding, an Industrial Chamber of Horrors, a model house fireproofed within and without, a mine gallery constructed with steel instead of wood, with lagging and fudged with coal, safety davits, signal lights, life buoys, collapsible lifeboats, occupational dusts, ambulances and emergency boxes are among the exhibits to be shown at the Exposition of Safety Devices, to open April 13 at the rooms of the American Museum of Safety Devices, 231 West Thirty-ninth street, New York. There is no charge for space. As the object of the exposition is not coercive but suggestive, the inventors and makers are invited to take part by sending their devices to Dr. William H. Tolman, director, at the museum. Among the exhibitors are the Carnegie Steel Company, Westinghouse Air Brake Company, American Bridge Company, Union Switch & Signal Company, Yale & Towne Mfg. Company and Travelers' Insurance Company. Three solid gold medals will be awarded for the best devices in transportation and mining and the best safety device for motor boats and motor vehicles. The chairman of the Committee of Direction is Charles Kirchhoff, and of the Exhibits Committee Prof. F. R. Hutton.

A Quick Engine Replacement.—Quick replacement of a wrecked engine, enabling speedy resumption of service, was illustrated a short time ago at the Davidson Rubber Works in Charlestown, near Boston, when upon shutting down in the evening the old Brown engine driving the plant was wrecked. The cylinder head and frame were demolished and the crank pin was broken, while the crank shaft and back bearing remained intact. Two days later an order for a 28 x 48 in. Allis-Chalmers engine was placed and work on the foundations begun. Three days after the contract was let the engine was shipped by express and arrived at its destination two days later. Parts of the old engine, such as the wheel and shaft, were used again, and the crank was rebored to take a new pin. By midnight, five days after letting the contract, the engine had been delivered and placed on the foundation, which in the meantime had been finished, though not yet quite dry. Three days thereafter the engine was turned over, and just 10 days after the order was placed was started up with its full load.

Chippewa Falls, Wis., has voted to issue bonds in the sum of $35,000 for the purpose of building a 300-ft. steel bridge over the Chippewa Falls River.

The Schuchardt & Schutte Steel Hardness Tester.

An Electro-Magnetic Instrument for Determining Certain Properties of Iron and Steel.

The fitness for their intended purposes of iron or steel products cannot be judged alone by chemical tests of their composition or physical tests of their strength under various kinds of strain, when their heat treatment has anything hardness, and is later referred to in substantiation of the accuracy of the electro-magnetic method of testing herein described. The latter has the further advantages that it is rapid and does not mar the appearance or affect the utility of the tested piece, since the most that is done to it is to subject it to a magnetizing influence by inserting it in a solenoid carrying an electric current.

The instrument illustrated is sold by Schuchardt & Schutte, 136 Liberty street, New York, and is based on the electro-magnetic balance invented by Prof. D. E. Hughes of England, who has deduced the following laws that hold with every variety of iron and steel: The mag-

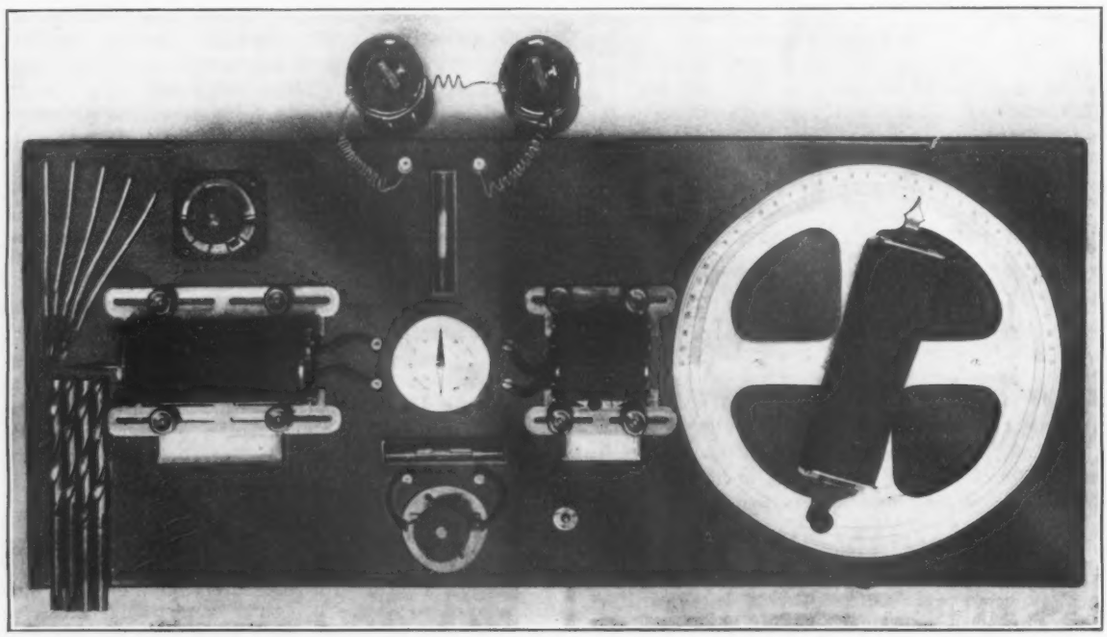


Fig. 1.—Top View of the Electro-Magnetic Instrument for Testing the Hardness of Iron and Steel.

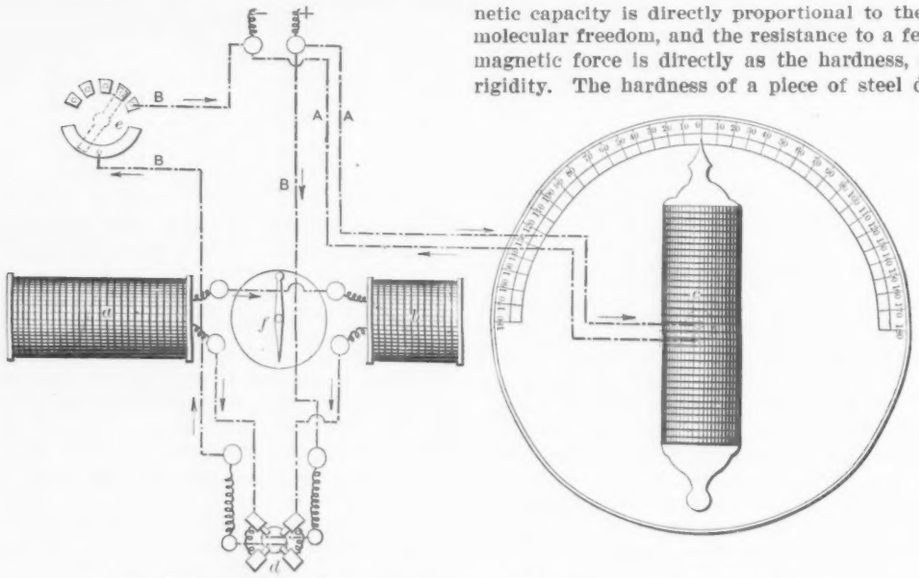


Fig. 2.—Diagram of the Arrangement and Wiring Connections of the Parts.

netic capacity is directly proportional to the softness, or molecular freedom, and the resistance to a feeble external magnetic force is directly as the hardness, or molecular rigidity. The hardness of a piece of steel depends upon its chemical composition and upon the degree to which it is tempered. By comparison with known standards this instrument therefore makes possible several determinations. Given an annealed specimen of known chemical composition, the percentage of carbon in any other annealed piece may be determined, or the degree of temper in any other piece of the same composition; given a fully tempered specimen of known composition, the carbon in another fully tempered piece may be determined, or the degree of temper of a piece of the same composition; given a standard that is known to be of proper composition and degree of temper for the most efficient service, the sufficiency or insufficiency of duplicate pieces is very speedily disclosed. The abilities of the instrument are

thing to do with their utility. An inferior article may be made from good material by improperly working or treating it. The cutting, elasticity and wearing or strain resisting properties are all functions of the hardness of a material, hence the importance of including in the tests to which it is subjected, one which will indicate the degree of hardness. The oldest and most familiar methods of testing the temper of finished pieces are to try its surface with hard steel punches or files. These are not only inaccurate at best, but have the disadvantage of injuring the finish. What is known as Brinnell's test consists of forcing a hardened steel ball into the piece to be tested and measuring the diameter of the impression. It is regarded as the most reliable mechanical means of test-

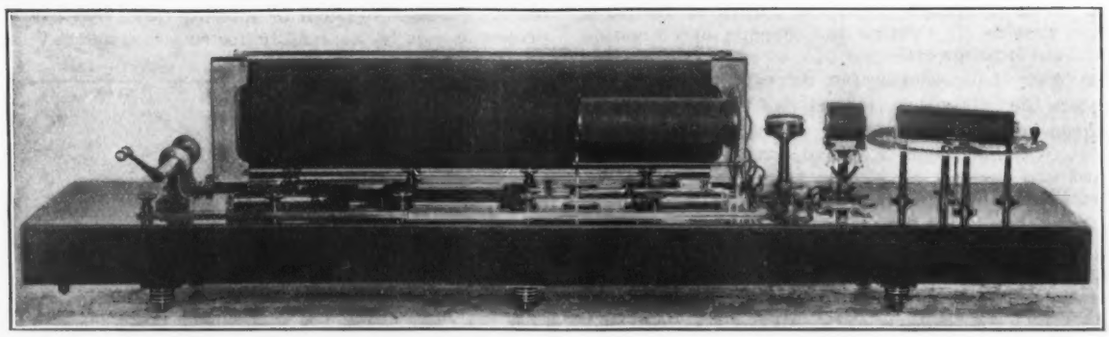


Fig. 3.—An Instrument for Testing Beams and Rails, Having Also an Extra Solenoid for Test Pieces.

such that it is not limited to the comparison of pieces of the same shape or size, but for the most rapid and commercially satisfactory use of it, where quantities of similar pieces are to be tested, it is desirable to first standardize a specimen of the same form and dimensions to be thereafter made the standard.

Inasmuch as the cutting property of a steel depends upon its hardness, the instrument is highly useful for testing tools of all sorts. Fig. 1 shows a top view of an instrument adapted for such purposes, being intended for testing drills, reamers and similar tools. With slight modification lathe, planer and like tools may be tested. Also since wear and strength are functions of hardness, a great variety of other important applications of the instrument may be made, as, for example, the testing of rails and structural shapes, where an instrument like that of Fig. 3 is suitable, which will be seen to be provided with a roller for facilitating the introduction of the test piece; the testing of rifle barrels, for which a long small diameter solenoid is provided as in Fig. 4. (This instrument is also somewhat universal, being arranged with several solenoids of various sizes to accommodate different parts that enter into a rifle); and the testing of projectiles, which may be done in an instrument such as that of Fig. 5. Being intended for the larger sizes requiring overhead means of handling, this one has a trunnioned solenoid which may be swung to vertical position while the test projectile is lowered into it, and then turned horizontally during the testing. Smaller projectiles may be tested in another type of instrument, not illustrated, which has a fixed solenoid with a sliding carriage for introducing the test piece. In all testing coils proper copper or brass thimbles or supporting forms are provided to hold the test specimen in the exact center of the solenoid. Where various shapes or sizes are to be tested interchangeable supports are furnished.

The principle of the electro-magnetic testing instrument and the manner of using it will be best understood from Fig. 2, which shows the relation and connections of the parts. The testing solenoid, or one in which the test piece is inserted is indicated by *a*; *b* is a balancing solenoid used to affect the compass needle *f* in a way later explained; *c* is an electromagnet known as the compensator which is arranged to revolve over a circular graduated scale. The other parts are incidental to the current controlling and directing features, *d* being a commutator for reversing the current through the solenoids *a* and *b*, and *e* a rheostat for altering the intensity of the current. The wiring circuits A and B indicate, respectively, those connecting the compensator *c* and the solenoids *a* and *b* with the source of current, which is preferably a battery of two or more dry cells affording a constant current at a pressure of from 3 to 8 volts.

The top view given in Fig. 1, taken in connection with the diagram Fig. 2, will best make clear the manner of operating the typical instrument. The entire apparatus is mounted on a board provided with adjusting screws and spirit levels at right angles, so that it may be accurately leveled. This is the first step after the instrument has been positioned, so that with no current flowing and the compass needle *f* pointing north and south, it is at zero of its scale, or as shown in Fig. 1. Before inserting the test piece and after the compensator is turned to its zero, current is passed through the solenoids. This will probably alter the position of the needle *f*, and the balancing solenoid *b* is adjusted axially until the needle returns to zero and no deflection is produced when the current is reversed, *i. e.*, the needle should remain at zero or as it stood when no current was flowing. This neutralizes the magnetic effect of the solenoid *a* when it has only an air core.

The instrument is now ready for use and the piece is inserted in solenoid *a*, immediately producing a deflection of the needle, because the steel or iron core which it forms affords a better path for the magnetic flux and increases its density. A damping device operated by a button on the board facilitates bringing the needle to rest at this and all later stages when its position is suddenly changed. The compensator is then revolved until its magnetic influence counteracts the distortion of the magnetic field produced when the piece was placed in solenoid *a*, or in other words, until the needle *f* is brought back to zero. The compensator has therefore been used to nullify only that part of the magnetic effect due to the inserting of the test piece in the solenoid *a*. The displacement of the compensator is then proportional to the magnetic capacity of the test piece and is read on its scale and noted. By turning the commutator *d* to reverse the current in the solenoids *a* and *b*, the needle is again deflected, but in the opposite direction, and the compensator is manipulated again until the needle is restored to zero. The compensator will then be found to have been turned roughly to the same angle as before on the opposite side of its neutral position, and the reading noted is added to the one previously taken. The compensator scale is graduated to give the magnetic capacity of the test piece in arbitrary units, allowing for the doubled reading given by reversing the current. The latter is necessary to eliminate the error which a single reading would have due to inequalities in form or character of the test piece, or the initial mag-

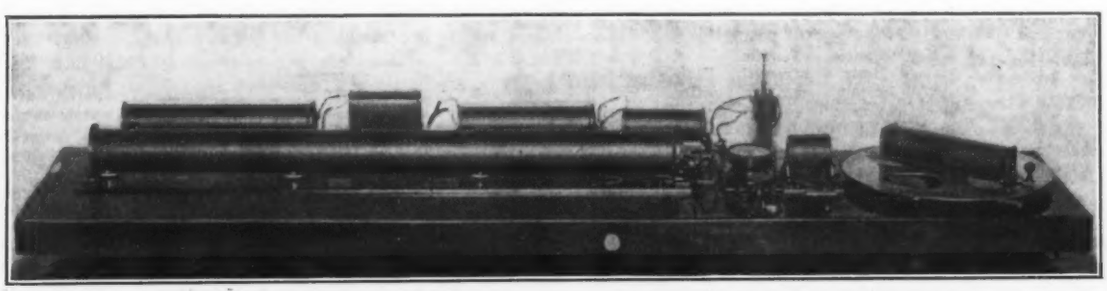


Fig. 4.—An Instrument for Testing Gun Parts.—An Example of How Several Shapes May Be Provided for on One Instrument.

netism which is always present in forged or tempered steel and that would increase the effect in one direction and decrease it in the other.

If a swing of the compensator through 90 degrees will not restore the balance, the intensity of the current must be changed through the rheostat *e*, or the distances of the solenoids from the needle increased. Where possible the standard and the test piece should be tested under the same conditions of current and positions of solenoids *a* and *b*, but if this is not expedient, due to a radical difference in the form or size of the two pieces, true comparisons may be arrived at by taking into consideration in the calculations the relative intensities of current in the two cases, and the positions of the solenoids as indicated on the scales attached beside their slides. To avoid calculations at the end and make the readings obtained directly proportional when the standard and test samples are of different size, the solenoids may be adjusted for testing each, so that their effects would be the same on the needle if their magnetic capacities were equal, *i. e.*, in accordance with the formula $f=\frac{m_1 m_2}{r^2}$ where f is the force exerted to attract or repel, m_1 and m_2 are the magnetic bodies, and r the distance between the magnetic poles.

As showing the influence of the dimensions of the test piece (cross section and length), the table I of data is interesting, taken from special tests of a steel of 0.398 per cent. carbon, 1.03 per cent. manganese, 0.07 per cent. silicon, 0.04 per cent. sulphur, and 0.06 per cent phosphorus:

tested, whether in rough or finished form, and a rail or projectile can be as readily tested as a finished razor

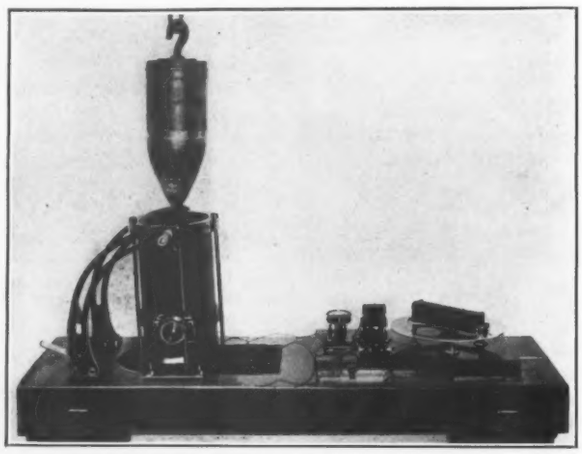


Fig. 5.—An Instrument for Testing 8-In. Projectiles, Showing the Receiving Position.—The Solenoid Swings Down After the Projectile Is Entered.

blade. For economical manufacturing the importance of the hardness test is apparent. The proper materials can always be selected before any labor and finish are put upon the article. The work can also be tested and inspected during process of manufacture and when finally finished to ascertain that it has the required hardness to best perform its intended service.

Table I.

Shape.	Dimensions of cross section or diameter.	Surface dimensions in square inches.	Weight in grams.	Cross section in square inches.	Actual magnetic capacity. Tempered Ann'led.	Tempered in oil.	Magnetic capacity proportional to a weight of 100 gm. Ann'led.	Tempered in oil.	Magnetic capacity proportional to a surface of 10 sq. in. Ann'led.	Tempered in oil.	Magnetic capacity proportional to a cross section of 1 sq. in. Ann'led.	Temp'ed in oil.
Square	0.312	8.072	79.059	0.0973	190	110	240	139	231	136	195	113
Round	0.312	6.34	61.977	0.0764	170	82	274	132	267	130	222	107
Rectangular	0.312 x 0.208	6.69	52.625	0.0649	155	82	294	155	235	123	239	126
Rectangular	0.312 x 0.156	6.00	39.61	0.0487	140	58	353	146	233	97	287	119
Square	0.208	5.34	35.1	0.0433	130	53	370	151	243	100	300	122
Round	0.208	4.10	28.4835	0.03396	110	46	386	161	262	109	323	135
Square	0.156	3.987	19.747	0.02434	95	36	481	181	238	89	395	150
Round	0.156	3.13	15.8735	0.01915	80	29	504	182	255	92	417.7	151

In this table the figures in the columns headed "annealed" and "tempered in oil" are the readings of the compensator, and represent the magnetic capacity as measured in the units in which the compensator is graduated.

The electro-magnetic test has been found by extensive experiments to agree closely with physical tests when a sufficient number of the latter had been averaged to correct for their own errors. Among other the Brinnell test has been compared with the electro-magnetic test and seems to confirm the even greater accuracy of the latter. Table II gives a comparison of the results obtained on steels of stated composition and physical properties, when tested by the Brinnell method and by the electro-magnetic method. It is of course to be understood that the figures of the two methods cannot be directly compared, but only by ratios, since each method employs arbitrary units.

Table II.

Composition of the steel. Per cent. C.	Mn.	Si.	Physical properties. Elastic limit, kg. per sq. mm.	Tensile strength, kg. per sq. mm.	Elongation, per cent.	Test by Brinnell's method. Ann'led.	Test by the electro-magnetic method. Tempered in oil.	Tempered in water.	Overheated for water hardening.	Ann'led.	Tempered in oil.	Tempered in water.	Overh'ted for water hardening.
0.09	0.27	0.48	19	33.6	31	112	128	143	149	1,000	968	800	440
0.11	0.28	0.05	26.8	37.9	35.5	112	128	137	140	889	870	730	544
0.45	0.645	0.2	40	64.8	23	183	269	466	532	510	261	243	544
0.43	0.489	0.09	35.5	63.2	18.2	183	248	466	532	580	270	249	250
1.1	0.187	0.27	50	73.8	17.5	217	387	480	532	406	225	150	117
Difference in dimensions according to the different methods.						1.93	3	3.35	3.8	2.46	4.3	5.33	4.65

Unlike the mechanical test the electro-magnetic test can be applied regardless of the condition of the piece

---

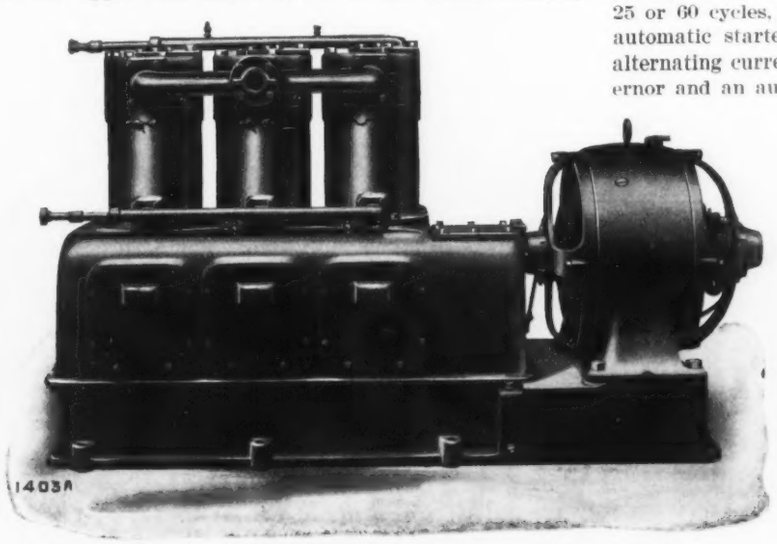
The manufacture of malleable cast iron fittings for automobiles is expected to develop to considerable proportions in the United States, according to the *Foundry*. For several years foreign builders of motor cars have used malleable castings with good results, and a car is now building in this country containing no less than 30 malleable parts. High grade material is specified for automobile malleables, and the prices paid have been quite remunerative to manufacturers who can meet the specifications.

Girder exports from Belgium in 1907 reached a total of 88,730 tons, as compared with 100,730 tons in 1906. The countries receiving the largest shipments of the above total were Great Britain, 14,310 tons; Egypt, 9050 tons; British India, 5280 tons, and Argentina, 11,010 tons.

The National Type 3 VS Air Compressor.

A motor driven air compressor, particularly suitable for shop and works supply, is that known as the type 3 VS, built by the National Brake & Electric Company, Milwaukee, Wis., and herewith illustrated. The aim was to make it a machine of unlimited utility, compact and self-contained, and capable of economical, reliable and efficient operation under all conditions. It is a single stage, medium capacity type of compressor, having three vertical cylinders. The vertical construction favors smaller dimensions and less strain and wear on the pistons and cylinder surfaces, and the inclosing of all working parts affords protection from mechanical injury. The compressor illustrated has a capacity of 100 cu. ft. of free air per minute at a pressure of 90 lb., but the compressors can be furnished for pressures up to 150 lb. at slightly reduced capacity.

The main frame is divided horizontally, the lower half supporting the bearings for the crank shaft, and also acting as a storage chamber for lubricating oil, and the upper half supporting the cylinders and being heavily ribbed to give maximum strength. Doors on both sides of the upper half afford access to the crank chamber,



A 100-Cu. Ft. 3 V. S. Type Air Compressor with Direct Current Motor, Built by the National Brake & Electric Company, Milwaukee, Wis.

crank shaft, connecting rods, &c. The motor is mounted on an extension of the lower half of the compressor frame, and drives through herring-bone open hearth steel gear and tool steel pinion, mounted inside of the crank case. The upper half of the frame contains an outboard bearing in which an extension of the pinion end of the armature shaft is fitted. There are four main bearings lined with lumen metal, and giving ample wearing surface. The crank shaft is a steel casting having four large bearing surfaces. The connecting rods are of cast steel to afford strength and stiffness at light weight. The wrist pin end of the connecting rod is fitted with lumen bushings, which are easily and cheaply renewed when worn out. The crank pin end is similarly fitted and is provided for taking up wear.

The compressor is provided with trunk pistons, each having a self-adjusting metal packing ring, which dispenses with the use of stuffing boxes. The cylinders are of hard, close-grained iron, and are subject to but slight wear, and the clearance of the piston has been limited as much as possible to increase the economy obtained. The suction and discharge valves are contained in the cylinder heads, which are of cast iron and are bolted to the cylinders. The valve seats are removable. By special piping the discharge ports of the three cylinders are all connected by one connection with the air receiver. The suction ports are similarly connected. The discharge valves are of the tubular type and the suction valves of the disk type. They work vertically and either set may be removed without interfering with the other. Access to them is had by removing the valve caps which are fastened to the cylinder head. Both the cylinders and cylinder heads are water jacketed.

The lubrication of the bearings and other working parts is liberal and automatic. The lower half of the crank case is partly filled with oil, which is splashed over the crank shaft bearings while the compressor is running. The driving gear is partly immersed in oil and lubricates itself and the pinion as well as the outboard bearing. An ingenious device lubricates the piston wrist pin, and consists of a long, slender tube with a steel ball valve at its lower extremity. This tube is fastened to the connecting rod and its upper end so secured as to permit oil passing through it to flow through oil holes under the wrist pin. By the action of the connecting rod oil is forced through this tube to the wrist pin as long as the compressor is in operation.

Either direct or alternating current motors may be provided for driving the compressor. The first are of the company's standard constant speed type, which are particularly well adapted to the work, as are also the alternating current or induction motors used in connection with the compressors. The latter are of the slip ring type, designed for operating on two or three phase circuits of either 25 or 60 cycles, and 200, 400 or 550 volts pressure. An automatic starter is furnished for either the direct or alternating current motors, which consists of an air governor and an automatic rheostat. By starting and stopping according to the demands upon the system they keep the pressure constant at the desired point.

A water governor can be had with these compressors, the function of which is to automatically stop the circulation of water in the jackets when the compressors are shut down and start it again when operation is resumed. Unloading devices actuated by magnets can also be furnished with either the direct or alternating current motor driven compressors when conditions require them. When other than electric drive is desired the machine can be provided for belt drive with a compressor part proper identical to that described. The complete line of compressors include those of capacities from 50 to 225 cu. ft. of free air per minute, requiring from 10 to 40 hp. for the drive. The smallest motor driven machine measures 77 in. long, 24½ in. wide and 36 in. high, and weighs 3500 lb. The largest is 110 in. long, 45 in. wide and 68 in. high, and weighs 8000 lb.

The college of engineering of the University of Wisconsin will this year give for the first time a summer course for advanced work for chemical, electrical, hydraulic, mechanical and gas and steam engineers. Much of the instruction will also be of practical value for architects and contractors, as well as practicing engineers and graduate students in engineering. The engineering summer session will be held at the same time as the regular university summer session, beginning June 20 and continuing until July 31. Fifteen members of the regular faculty of the college of engineering, assisted by Prof. John J. Wilmore of the Alabama Polytechnic Institute, will conduct the instruction in the various departments.

Statistics published by the Government of India show that the production of manganese ore from being 253,896 tons, valued at $1,241,545, in 1905, was 495,730 tons, valued at $2,176,340, in 1906. Only 150,297 tons were mined in 1904. The production of iron ore in 1906 was 74,106 tons, against 102,579 tons in 1905. Only sufficient iron ore is mined for the needs of the Baracar Iron Works, the only plant smelting according to European methods. Practically all the iron ore of India is supplied by the province of Bangal.

Test of a Mietz & Weiss Oil Engine Air Compressor.

There is such a scarcity of material showing actual results of tests of air compressors in service that the following tests made of a Mietz & Weiss air compressor direct connected to a Mietz & Weiss oil engine may be of interest, especially as the volumetric efficiences of this compressor were obtained by actual measurement of the air discharged and not from indicator cards. A general arrangement of the complete set, which is built by August Mietz, 128 Mott street, New York, is shown in Fig. 1. Before describing the special features and tests of the air compressor, however, the oil engine and a test of the oil consumption will be described.

The engine is of the two-cycle type, and is claimed to be as simple, reliable, economical, safe and neat in design as the builders' horizontal engine. The oil fuel feeding and distributing depends upon the pressure difference in the cylinders, the injection pump being under direct control of the governor. This system is simple, and exactly regulates the quantity of oil delivered to each cylinder under varying loads and speeds. The use of a single pump for multicylinder engines has proved satisfactory and does not impair the fuel economy.

The fuel oil is stored in a tank, which may be placed at the side of the engine or underground. A small pump, *p*, feeds it through the injection nozzle *o* into the cylinder, and forces it to the projection *v* of the igniter *i*. Each cylinder is provided with a needle valve, *n*, at each injection nozzle for putting a cylinder out of action if necessary. The igniter *i* is a hollow, spherical casting, and is heated by a gas or oil lamp before starting the engine; during the operation of the engine it is kept hot enough to ignite the successive charges without a flame or electrical sparking device. The projection *v*, which is at the same high temperature as the igniter, vaporizes the oil.

The method of operation is as follows: Air is drawn into the closed crank case through a port, *a*, in the lower part of the cylinder. On the downward stroke of the piston this air is compressed, and a port, *b*, opened by the piston, allows it to pass, together with the steam generated in the water jacket, to the combustion space of the cylinder. At the same time the exhaust port *e*, being overrun and opened by the piston, discharges the products of combustion. The fuel oil is mixed with the air and steam, so that on completion of the compression or return stroke the mixture of air, oil vapor and steam is automatically fired, the expansion driving the piston downward. The heat imparted to the water in the cylinder jacket is allowed to vaporize and the steam produced is passed into the cylinder. By means of a device similar to a steam trap the water is maintained at a constant level, regardless of the temperature of the cylinder. Thus, there is no circulation, as usually found, but only as much water is supplied to the jacket as is needed to make up the loss by evaporation. The use of steam reduces considerably the trouble from carbon deposit in the cylinder and makes it possible to operate the engines, not only by common kerosene oil, but also fuel or crude oil.

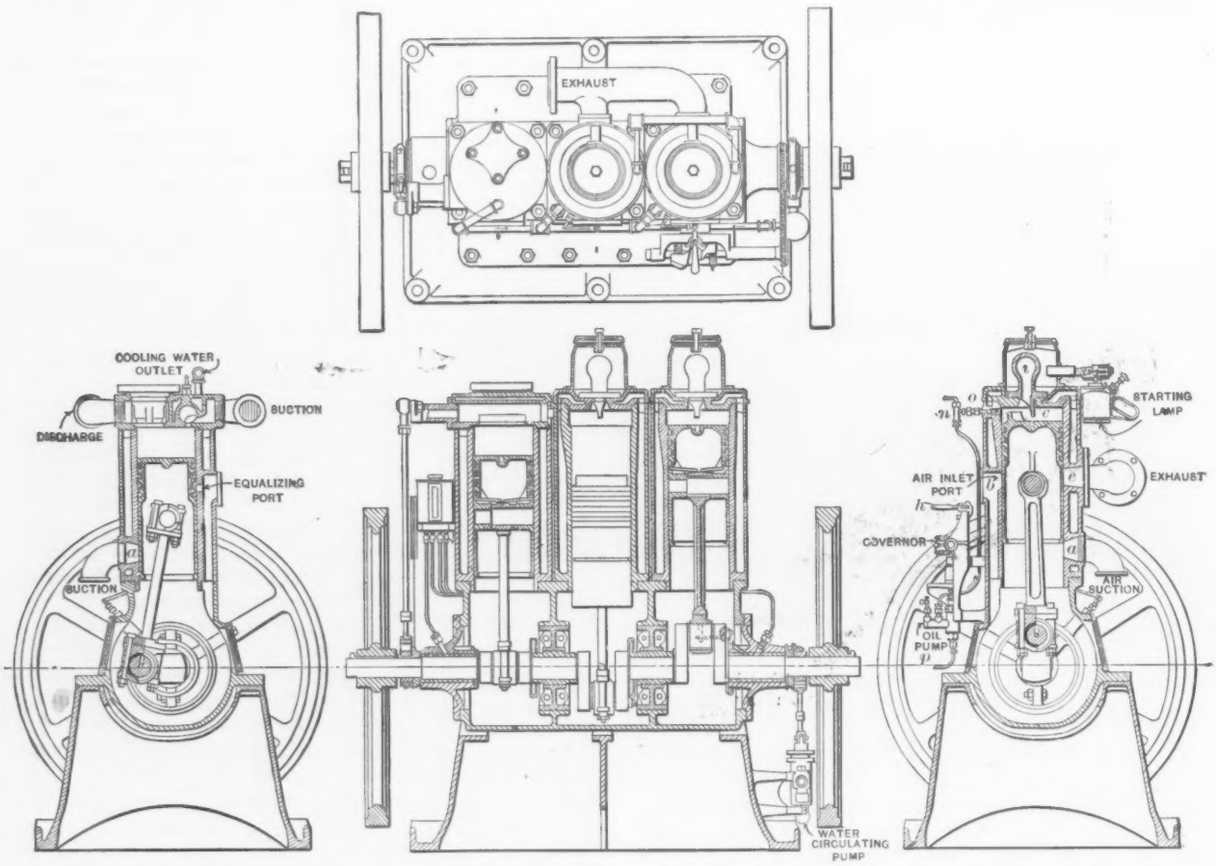


Fig. 1.—Top View and Sectional Elevations of a Mietz & Weiss Combined Air Compressor and Two-Cylinder Oil Engine.

As appears from Fig. 1 there are no valves or other moving auxiliary parts except the fuel pump *p*. The speed of the engine is controlled by a centrifugal governor, driven by gears and silent chain from the main shaft, both gears being keyed on the shaft. The governor operates an eccentric, which works in conjunction with the plunger of the pump *p*. The speed of the engine can be accelerated or retarded by tightening or releasing the governor springs at the adjusting screws. It can be regulated by a throttle or hand regulator, *h*, which limits the stroke of the pump or throws it away from the governor eccentric entirely, thereby stopping the engine.

One of the latest features of the Mietz & Weiss engines is the force feed lubricator for oiling the cylinders, piston, crank pins and shaft bearings. The lubricator has no valves and is mechanically operated. It consists of an oil reservoir, containing two steel worm wheels, driven by a single worm on the driving shaft, and in turn operating ratchets, which actuate plungers and eject the oil.

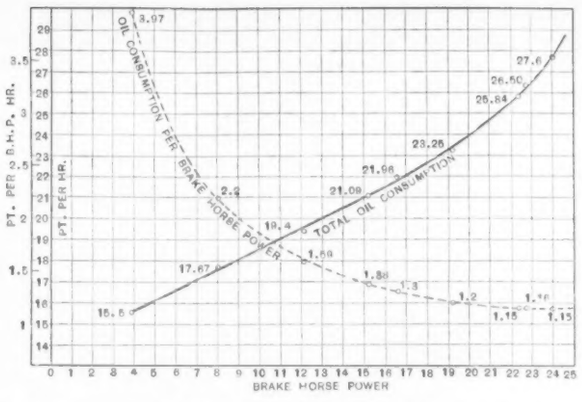


Fig. 2.—Curves of the Engine's Oil Consumption with the Compressor Disconnected.

Data and results of tests made on the engine shown in Fig. 1 are summarized in the following table and in the curves of Fig. 2:

Diameter of cylinder, inches	8						
Area of piston, square inches	50.26						
Length of stroke, inches	8						
Piston displacement, cubic inches	402						
Piston displacement from exhaust port closure to inner dead center, cubic inches	314						
Clearance volume, cubic inches	116						
Clearance, per cent., of volume at beginning of compression, per cent	27						
Number of run	1.	2.	3.	4.	5.	6.	7.
Brake horsepower	3.9	8.0	12.16	16.55	19.2	22.42	24
Revs. per minute	432	424	419	407	394	390	385
Oil consumption, total per hour, pints	15.2	17.67	19.40	21.96	23.25	25.84	27.6
Oil consumption, total per hour, pounds	13.7	15.62	17.16	19.4	20.55	22.84	24.84
Oil consumption per brake horsepower per hour, pints	3.97	2.2	1.59	1.32	1.21	1.15	1.15
Oil consumption per brake horsepower per hour, pounds	3.51	1.94	1.41	1.17	1.07	1.02	1.02
Approximate cooling water consumption, gallons per hour	...	...	...	...	...	10	...
Specific gravity of oil	0.848	0.848	0.848	0.848	0.848	0.848	0.848

Description of Air Compressor.

The air compressor differs in many particulars from others on the market. One departure is the driving by direct connection to the oil engine crankshaft instead of by belt or gears. Compactness is secured, floor space minimized and expense of foundation reduced. Such an equipment is especially useful in machine shops and foundries, and when made portable, as in Fig. 3, in mines or other places, where but little attention can be given to a compressor.

The compressor, of which the following tests were made, is of single acting type, with 8-in. cylinder diameter and 8-in. stroke, running at about 400 rev. per min. It is commonly believed that a compressor can not run at high speed, but automobile engines run satisfactorily at very high speeds and yet they combine the function of an air compressor, using the air in the combustion of their fuel instead of discharging it. Fig. 4 illustrates an air compressor running at 600 rev. per min.

A special feature in the design of this compressor is the advantage taken of the pressure in the crankcase. It works on the same principle as the engine already described. Air is drawn into the closed crankcase through a port *a* in Fig. 1 in the lower part of the cylinder when the piston is nearing its upper dead center. On the down stroke this air is compressed, and simultaneously the space above the piston is filled with air at atmospheric pressure through the mechanically operated suction valve. This valve is closed at the moment the piston uncovers the equalizing port, and the compressed air from the crankcase rushes through this port and increases the presssure in the cylinder several pounds above the atmospheric pressure.

Fig. 5 shows two indicator cards, the one at the left being an ordinary pressure card taken with a 100-lb.

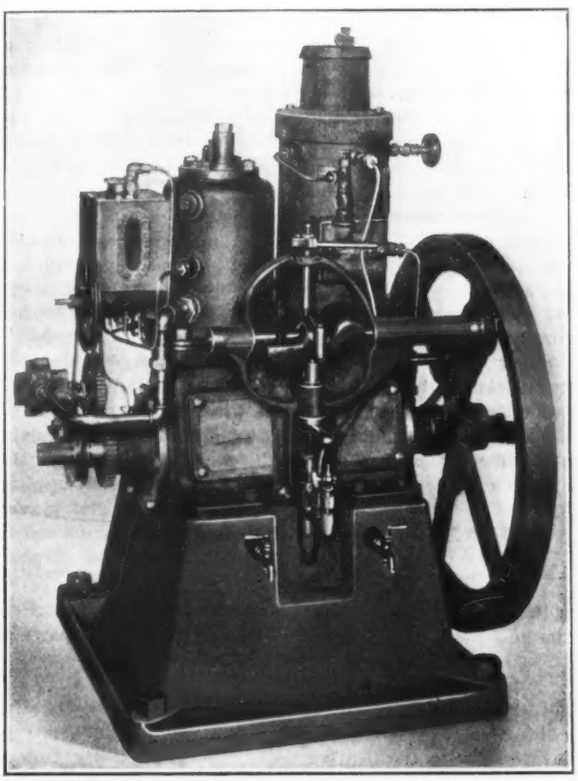


Fig. 4.—An Equipment Similar to that of Fig. 1, but Having Only One Engine Cylinder.

spring, and the second one one taken with a light spring and pencil stop arrangement to investigate the functions of the equalizing port. At high speeds the pencil mechanism is subjected to serious vibrations which greatly influence the shape of the indicator card, and a fairly good card

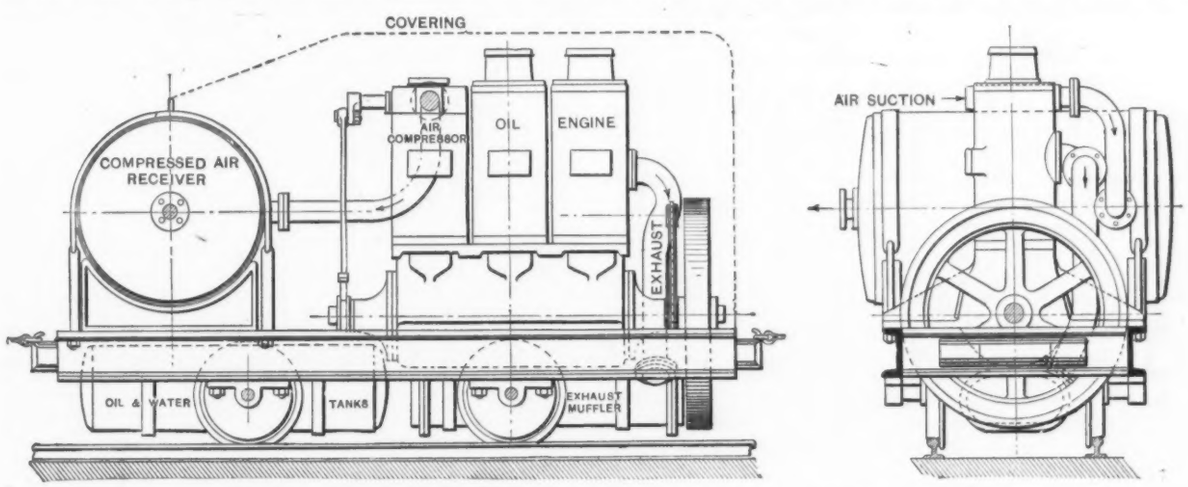


Fig. 3.—A Mietz & Weiss Portable Oil Engine and Air Compressor Outfit for Mines.

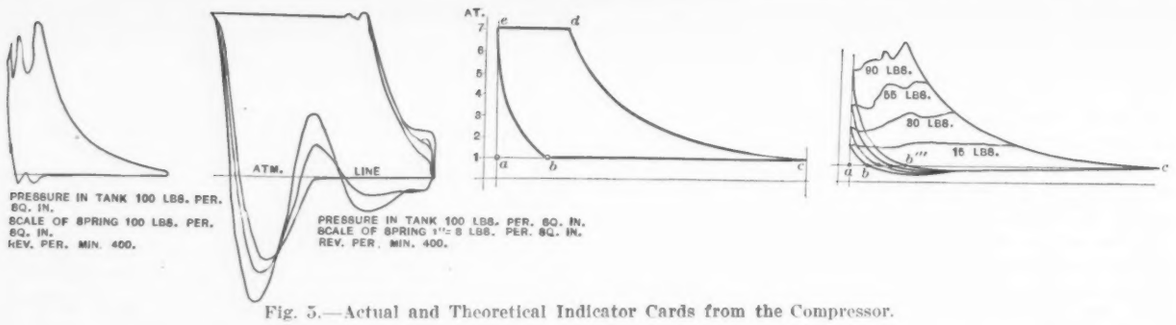


Fig. 5.—Actual and Theoretical Indicator Cards from the Compressor.

can only be obtained with a short movement of the drum and a relatively heavy spring. The cards are too small for computing the indicated horsepower, but they give a fair idea of the suction and compression lines. The clearance losses are very small (only 1¼ per cent.), and special care was given to the cooling of the cylinder walls and cover.

The commercial value of any compressor depends on the actual quantity of air it delivers and the power it requires to compress and discharge the air. The correct determination of the air actually discharged is of importance, inasmuch as this is the only item that furnished the necessary data to establish the actual power consumed by the compressor.

Of three compressors of the same size, same clearance volume and same speed, the first may discharge the normal quantity of air at the normal power, the second less air at less power, due to leakage, and the third still less air at greater power than any of the preceding compressors, due to the throttling and heating of the suction.

It is common to give the piston displacement per minute as the quantity of air delivered by a compressor. No account is taken of the re-expansion losses resulting from the clearance volume. The piston displacement must be multiplied by the volumetric efficiency in order to find the actual amount of air delivered. A method often applied for finding the volumetric efficiency and often giving very unsatisfactory results is the use of the indicator card. The ratio $\frac{a\ c}{b\ c}$ of the third diagram in Fig. 5 is called the volumetric efficiency. The line $a\ b$ depends on the size of the clearance volume and the nature of the re-expansion curve.

Common to all air compressors is the fact that the volumetric efficiency is less than that theoretically obtainable from the re-expansion curve. This difference is largely due to the heating up of the entering air, caused by the higher temperature of the cylinder walls and piston. Another reduction of the volumetric efficiency, not shown on the indicator card, is due to leakages. If a certain quantity of air is taken into the cylinder part of it may leak by the piston or back into the suction pipe during the compression stroke. A compressor being equipped with a mechanically operated suction valve can easily be adjusted to show any desired volumetric efficiency on the indicator card. it is only necessary to open the valve right after the piston leaves its dead center, so that the compressed air left in the clearance space returns into the suction pipe; doing so the re-expansion curve falls very rapidly and nothing is gained in volumetric efficiency, but instead a loss of power is unavoidable. A mechanically operated suction valve must not open before the re-expansion curve cuts the atmosphere line. This point cannot, however, be accurately determined, and besides it changes when the discharge pressure changes.

The volumetric efficiencies of the Mietz & Weiss compressor were obtained by pumping into a large receiver E, Fig. 6. Very often a tank containing a certain number of cubic feet is simply pumped up from zero to the pressure the compressor is designed for; and the time and number of revolutions necessary to fill the tank are observed. If a tank containing a volume V is pumped up from a pressure P_1 to another P_2 (absolute pressures), the formula for finding the quantity of air V pumped, expressed in terms of one atmosphere absolute (disregarding the temperature), is

$$v = V\ (P_2 - P_1).$$

If, for example, the tank has been pumped up from 0 to 7 atmospheres gauge pressure, the quantity of air discharged by the compressor is

$$v = V\ (8 - 1) = 7\ V.$$

The theoretical quantity is equal to the piston displacement $A \times S$ (A = area, S = stroke of compressor), multiplied by the number of revolutions n taken to fill the tank; and the volumetric efficiency u is therefore represented by the formula.

$$u = \frac{V\ (P_2 - P_1)}{A \times S \times n}$$

Following the above method, the volumetric efficiency was obtained not for the pressure of 7 atmospheres, which the compressor finally worked against, but for only about 3.5 atmospheres. When pumping up the tank the volumetric efficiency decreases gradually when the pressure increases. This fact is shown in the right hand diagram in Fig. 5.

Fig. 6 is a sketch of the arrangement of apparatus used to find the volumetric efficiency of the compressor in the present test. Two tanks, E and F were used and by means of the regulating valve V the air in F was maintained at the constant pressure from which it was intended to establish the volumetric efficiency. The large tank E was pumped up from a pressure P_1, to another P_2, either one lower than the pressure in the tank F.

It is advisable not to commence any test when the pressure gauge indicates zero, if a commercial gauge is used. (In these tests a standard Schaeffer & Budenberg test gauge was used.) Commercial gauges do not register accurately at the zero point. It is possible that a slight pressure is at hand while the gauge does not show it. Therefore, the tank should be shut off first and the pressure and the pressure gauge watched till it passes a suitable point, say 10 lb. From this time on until the pressure P_2 is reached the number of revolutions

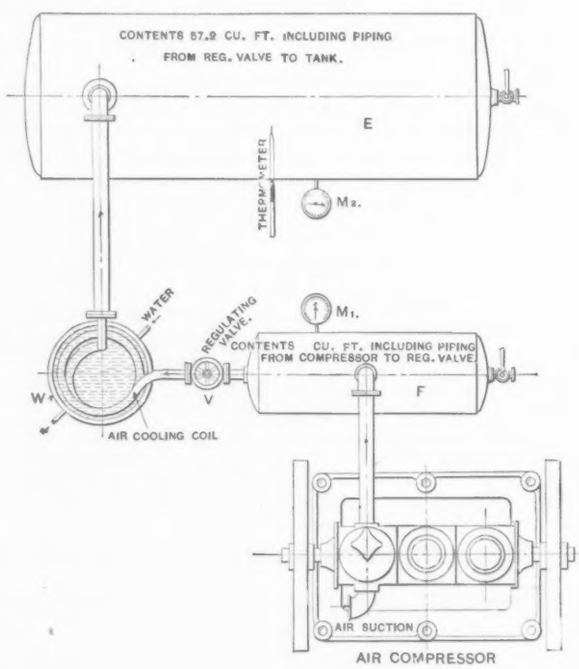


Fig. 6.—Sketch Showing the Arrangement of the Testing Apparatus.

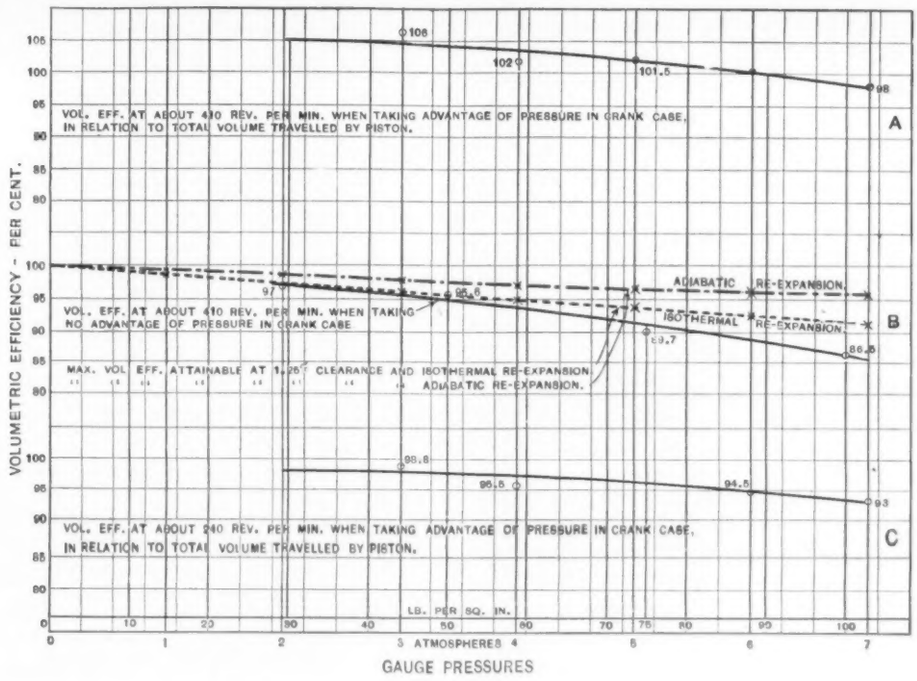


Fig. 7.—Curves of the Volumetric Efficiencies of the Compressor.

of the compressor, time of run, temperature, &c., were taken.

If the compressor is located near the tank the temperature of the air is considerably higher when it reaches the tank than when it is sucked into the cylinder, unless a cooler, as shown in Fig. 6, is employed. If there is no cooler the temperature must be measured and considered in the calculations. The quantity of air u discharged into the tank, expressed in terms of atmospheric pressure and suction temperature is then found by the following formula:

$$v = V\,(273 + t_a)\left(\frac{P_2}{273 + t_2} - \frac{P_1}{273 + t_1}\right)$$

Where t_a represents the temperature of the room, from which the compressor takes the air; t_1, the temperature of the air in the tank at the beginning of the test; t_2, the temperature of the air in the tank at the end of the test (all temperatures in degrees centigrade); P_1, the pressure of the air in the tank at the beginning of the test; and P_2, the pressure of the air in the tank at the end of the test (pressures in atmospheres absolute).

If the temperature is neglected the volumetric efficiency appears 1 per cent. too high for every 3 degrees C. difference of temperature of the air in the tank, and that in the room from which the compressor takes the air. The barometric pressure also influences the results and cannot be neglected for accurate calculations. Commercial gauges are usually graduated in 14.7 lb. (29.92 in. mercury), to the atmosphere. If the barometric pressure varies from the above it must be allowed for, and the formula becomes:

$$v = V\,\frac{273 + t_a}{B}\left(\frac{29.92 \times P_2}{273 + t_2} - \frac{29.92 \times P_1}{273 + t_1}\right)$$

where B is the barometric pressure in inches of mercury.

The principal data and results of the volumetric efficiency tests of the Mietz and Weiss compressor are summarized in the following table and plotted in Fig. 7:

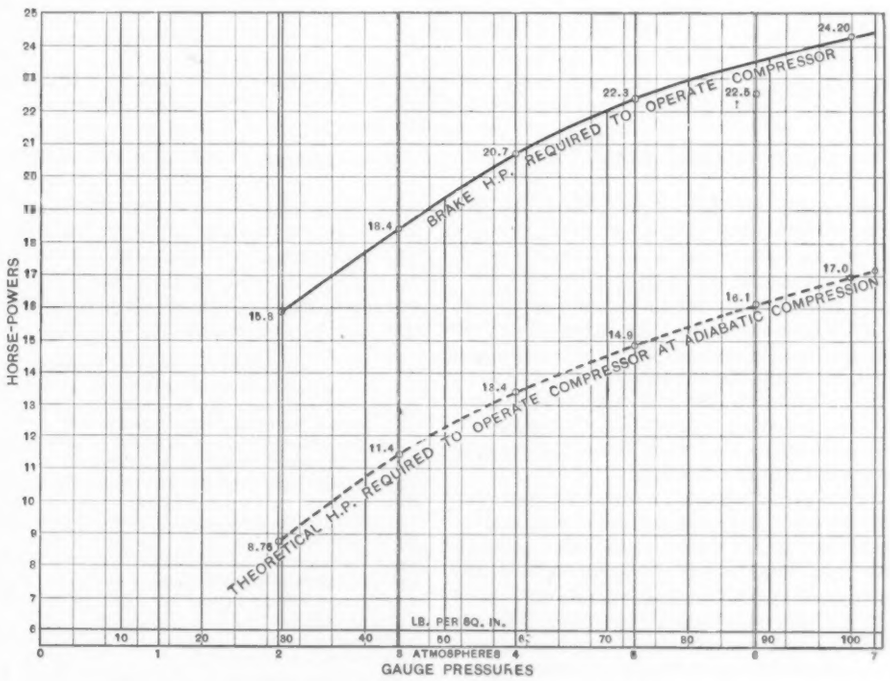


Fig. 8.—Curves of the Horsepower Required to Operate the Compressor.

Compressor Data.

Diameter of cylinder, inches	8
Area of piston, square inches	50.26
Length of stroke, inches	8
Piston displacement, cubic feet	0.2327
Clearance volume, per cent	1.25
Contents of tank, including piping, cubic feet	57.2

Contents of tank, including piping, 57.2 cu. ft.

Number of run	1.	2.	3.	4.	5.
Barometric pressure in mercury	29.9	29.9	29.9	29.9	29.9
Gauge pressures:					
At discharge of comp., pounds per square inch	44.1	58.8	73.5	88.2	103
P_1 in tank at start of test, pounds per square inch	14.7	14.7	14.7	14.7	14.7
P_2 in tank at finish of test, pounds per square inch	44.1	58.8	58.8	73.5	88.2
Temperatures:					
t_1 in tank at start of test, Cent.	30.5	30.5	32	32	33
t_2 in tank at finish of test, Cent.	37	42.5	43.5	46.5	50
t_a of suction, Cent.	30.5	30.5	30.5	30.5	30.5
Of cooling water at inlet, Cent.	13	13	13	13	13
Of cooling water at outlet, Cent.	27	29	30	31.5	34
Quantity of cooling water, gallons per hour (approximate)	90	90	90	90	90
Duration of run, seconds	63.6	97.6	99	132.4	171
Total number of revolutions	444	678	680	900	1,161
Revolutions per minute	419	417	412	408	406
Actual quantity of air discharged per minute, cubic feet	103.3	99	97.4	96	92.6
Piston displacement per minute, cubic feet	97.5	97	95.9	94.94	94.47
Volumetric efficiency, per cent., in relation of volume swept per minute	106	102	101.5	101	98

suction pipe, and connect to it a vacuum gauge. This was done in this case and a vacuum as low as 98.5 per cent. could be observed—the lowest possible at 1¼ per cent. clearance.

In Fig. 7, group B, are plotted the theoretical volumetric efficiencies, derived from isothermal and adiabatic re-expansion of the air inclosed in the clearance volume. The isothermal curve is obtained from the formula:

$$N_v = \frac{1 - a\,P.}{1 - a}$$

The equation is that of a straight line. The adiabatic curve, which is never obtained in practice, follows the formula;

$$N_v = \frac{1 - a\,P.^{\frac{1}{k}}}{1 - a}$$

where $k = 1.41$ and represents a parabola approaching a straight line.

The power required to operate the compressor was determined in the following way: The connecting rod of the compressor was disconnected from the crank shaft, and the oil engine tested for its brake horsepower at the same time the oil consumption was measured. The latter is plotted in Fig. 2. The compressor was then connected again and by means of the regulating valve V, Fig. 6, the pressure in the tank F was kept constant. The oil consumption was again determined, and the cor-

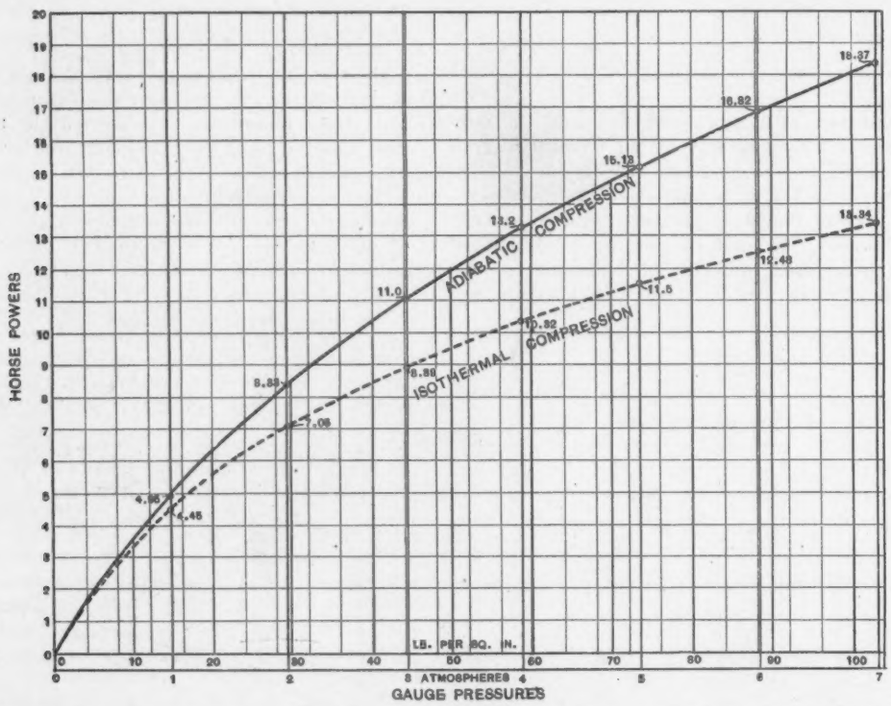


Fig. 9.—Curves of Theoretical Horsepower Required to Compress and Deliver 100 Cu. Ft. of Free Air Per Minute.

Each test was made at least three times, and the values given in the preceding table are the averages. The data for each test did not vary more than 1¼ per cent. either way from the tabulated figures.

From Fig. 7 it can be seen that three different groups of tests were made as follows: A—taking advantage of the pressure in the crank case and running the compressor at about 400 rev. per min.; B—taking no advantage of the pressure in the crank case, and running the compressor at the same speed as before; and C—taking advantage of the pressure in the crank case and running the compressor at only 240 rev. per min.

There is considerable difference between the efficiencies of tests A and B, and also between A and C. The former shows the actual gain by the use of the air from the crank case, and test C gives proof that any small leakage caused by the piston, valves, &c., is of greater consequence in a slow speed compressor than in one of high speed—a fact demonstrated long ago in tests of internal combustion engines. A method often applied to reveal leakage in a compressor is to blank flange the

responding brake horsepower directly obtained from Fig. 2. These results are shown in the following table, and are plotted in Fig. 8 with the theoretical horsepower at adiabatic compression, which can either be obtained from the theoretical indicator card neglecting the clearance space, or by the formula:

$$W = 3.463\ P_1\ V_1 \left\{ \left(\frac{P_2}{P_1} \right) 0.29 - 1 \right\}$$

Number of run	1.	2.	3.	4.	5.	6.
Revolutions per minute of compressor	423	415	410	405	401	398
Pressure in tank pounds per square inch (gauge)	29.4	44.1	58.8	73.5	88.2	100
Quantity of air discharged, cubic feet	103.8	102.6	98	96.8	95	93
Oil consumption, total per hour, pounds	18.94	20.25	21.63	22.8	22.95	24.84
Oil consumption, total per hour, pints	21.4	22.9	24.4	25.8	26	28.1
Corresponding brake horsepower	15.8	18.4	20.7	22.3	22.5	24.20
Theoretical horsepower required	8.75	11.4	13.4	14.9	16.1	17
Net or total efficiency	55.4	62	64.8	66.8	71.5(?)	70.1

The power consumed, compared with the air discharged, often appears too favorable, for the reason that the quantity of air discharged is assumed too high, as is nearly always true when the volumetric efficiency is taken from the indicator card, or even the displacement considered as the amount of air delivered.

In Fig. 9 are shown the theoretical horsepower curves for 100 cu. ft. of free air at various pressures, and adiabatic and isothermal compression at single stage compression. Should it appear in practice that for any compressor a better adiabatic curve at a corresponding pressure was found, it would not prove excellence of design of the compressor, but rather corroborate the fact that it did not deliver the air assumed in the calculations and a leakage will usually explain the low power required.

To obtain the actual horsepower required to operate a compressor the theoretical power must be multiplied by the net or total efficiency. The net efficiency is the product of the indicated and mechanical efficiencies. The indicated efficiency is the ratio of the theoretical indicator card to the actual indicator card taken from a compressor. The latter is larger than the former, due to the valves, heating of the air when entering the cylinder and sometimes leakage from the discharge valve. The indicated efficiency varies from 80 to 95 per cent., depending upon the design of the compressor and valves. The mechanical efficiency is about the same as found for steam engines and may be from 70 to 90 per cent.

The net efficiency of the Mietz & Weiss compressor is 70.1 per cent. at 100 lb. pressure, as shown in Fig. 8 and a table previously given. Assuming the mechanical efficiency of this small compressor to be 80 per cent. the indicated efficiency would be 87.6 per cent., since $70.1 = 80 \times 87.6$. The power required is, therefore, not more than that necessary to drive a slow speed compressor directly from an engine. If a compressor must be geared or belted the losses resulting from these drives will naturally reduce the net efficiency of the installation.

A number of the compressors described have been built for the United States Government, and one of them is installed in the builder's works to supply the different shop departments with compressed air. It is constantly in use and requires very little attention. The cost for a 10-hr. run to compress and deliver 60,000 cu. ft. (or 100 cu. ft. per minute) of free air, at 100-lb. pressure with this oil engine and air compressor is $2.60, including $1.50 for fuel oil at 4 cents per gallon, 10 cents for water, 50 cents for lubricating oil and waste and 50 cents for attendance. This type of air compressor is built in sizes of from 10 to 200 cu. ft. of free air per minute and for pressures up to 100 lb.

Canadians Would Conserve Niagara Falls Power.

Canadians have become aroused to the conviction that existing power franchises still undeveloped form a menace to the Falls of Niagara, and the commissioners of Victoria Park at Niagara recommend in their report for 1907, just sent to the Ontario Legislature, that these charters be nullified. The report says:

Impressed with the vital importance of the subject, the commissioners would again draw attention to the charters which have been granted by the Parliament of Canada to several corporations to generate power at various points in the Niagara District from water which at present flows through the Niagara River and over the Falls, for which charters have not up to the present time been proceeded with. Without question the works already constructed by the three companies operating on the Canadian side are of sufficient capacity to supply the demand for electricity for lighting and power purposes for Canadian uses for a great many years to come.

As the undeveloped charters are all without limitation as to the volume of power which may be developed, and without restrictions as to the quantity of water which may be taken for such development, it is essential to the safeguarding of the Falls that immediate steps should be taken to cancel them, or to place a limit on their operations, so that the menace they now present to the preservation of the Falls as a great natural wonder may be removed. In this connection the commissioners would strongly recommend that the government of the Province of Ontario, being chiefly interested, should be officially represented at any international conference that may be held, having in view the uses of the waters of Niagara for commercial purposes or for the limitation of such uses in furtherance of the preservation of the Falls.

This latter request of the commissioners to be represented at international conferences having a bearing on the preservation of the falls is significant, for up to this time the province has been very pronounced in its position that the development should not be checked, its Hydro-Electric Commission having organized or had connection with a municipal league for the wide and extended distribution of electrical power from Niagara. Ontario expects much from this power transmission, many places awaiting the coming of the current in order that new industries may be developed and thrive.

Columbia University Course Revision.

In 1907 Columbia University revised the entrance examination requirements for its schools of mines, engineering and chemistry by simplifying them and co-ordinating them with the programmes of the best secondary schools. By the adoption at the same time of a uniform programme of studies for the first year in all courses, students were no longer compelled to make up their minds at the outset as to the particular course they desired to take, and it became much easier for college graduates to enter the schools with adequate credit for advanced standing. Following these steps have come the co-ordination and revision of the three subsequent years of each of the courses. This revision, which has been the subject of earnest consideration by the Committee on Programme of Studies and by the officers of instruction concerned, has just been formally adopted by the faculty and will go into effect on July 1.

In the first place, the programmes have been thoroughly co-ordinated by cutting out such duplication of instruction as had grown up in the development of the several departments, and courses whose value has been lessened by changes in actual professional methods have been replaced by subjects of greater value to the professional students of to-day. Second, the work in many subjects has been made more intensive, and as a result it has been possible to reduce the total number of attendance hours in such courses. Third, the free time created by this work of excision and condensation will make possible the introduction of important new material. For example, new courses in gas power and steam power machinery and in alternating current laboratory practice have been introduced in the third year of the course in mining engineering. The course in mechanical engineering will have additional work in machine design, in the design of manufacturing plants, in metallurgy, in shop organization and works management, and the course will be further broadened by instruction in industrial law and economics.

The results of the change in entrance requirements and the uniform first year have been most satisfactory to the schools, the total of new students in 1907-08 being 239 as against 162 in 1906-07, a gain of 47½ per cent., and the number of entrance conditions carried by students being reduced 62 per cent. and the number of term conditions 43 per cent. It is expected that the new programmes in the professional courses, together with the close personal contact which is now being maintained by the dean and the professors with all the students in the schools, will still further enhance the reputation of the historic "Columbia School of Mines."

The annual meeting of the Lake Superior Corporation was held in Jersey City April 6, at which peace was restored between the contending interests. Directors were elected as follows: Francis B. Reeves, James Hay, Horatio G. Lloyd, Charles S. Hinchman, J. Tatnall Lea, all of Philadelphia; John T. Terry of New York, Leander N. Lovell of New Jersey, Charles D. Warren of Toronto, Thomas J. Drummond and O. R. Wilson-Smith of Montreal, George Tatginson of Preston, Ont., and William J. Sheppard of Toronto. Charles D. Warren was re-elected president, Francis B. Reeves was chosen first vice-president and John T. Terry secretary and treasurer.

The Kennedy Gyratory Crusher.

The Kennedy gyratory crusher is a recent addition to a line of rock crushing machinery made by Chalmers & Williams, Commercial National Bank Building, Chicago, Ill., at their Chicago Heights factory. As will be seen from Fig. 1 this machine in its general design does not depart radically from the usual crushers of the gyratory type, but it embodies certain improvements which, it is claimed, make it one of the most modern and efficient machines of its class.

Among the features of chief importance are the arrangement of the hopper, which permits the removal of the spider, concaves, main shaft or crushing head without detaching it from the top shell; the high arch of the two spider arms providing ample space for the free passage of rock or ore as it is carried around the hopper; the ball and socket self-aligning eccentric having an unusually large eccentric contact tending to diminish the wear and contributing to uniformity of operation and output, and the keyed fastening provided to connect the main gear with the eccentric sleeve which facilitates the babbitting of the eccentric. The double arm spider is cast in one piece with the ring, which rests on top of the shell and supports the bearing from which the main shaft is suspended. This bearing plays an important part in the gyratory movement of the shaft because of its unusually wide range of adjustment.

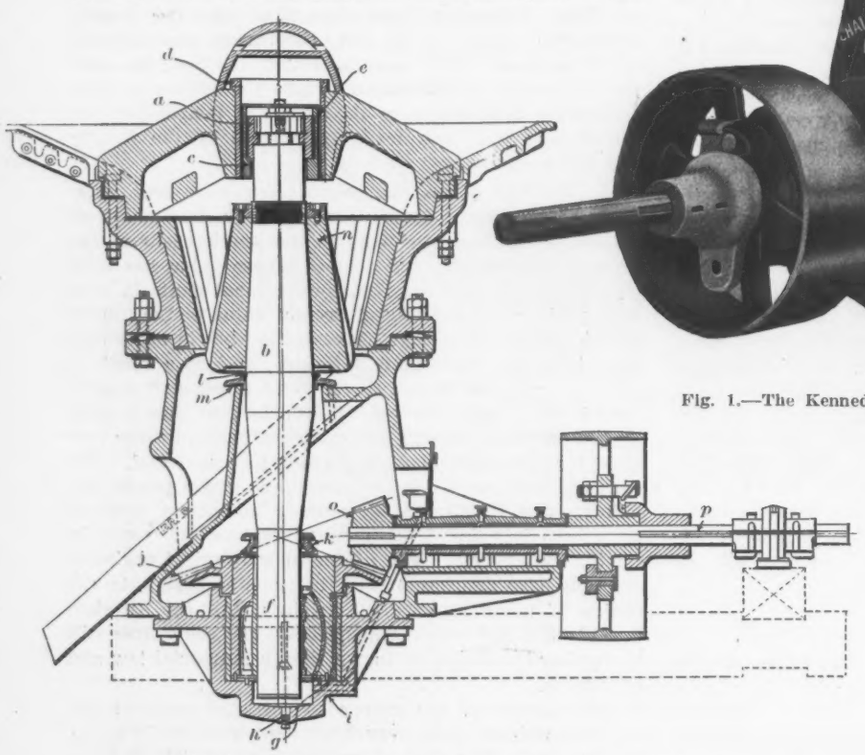


Fig. 2.—Sectional View of the Kennedy Gyratory Crusher.

A clear idea of the principal parts of the machine is conveyed by the sectional drawing, Fig. 2. It will be seen that a suspension ring, *a*, is keyed to the upper end of the main shaft *b*, and is supported by an adjusting nut, *c*, screwed into a steel sleeve, *d*, set in the spider. A steel bushing, *e*, caps the suspension ring, and protects it from contact with the thread on the inside of the sleeve. By means of the vertical adjustment afforded by the adjusting nut the fulcrum can be changed to an extent equal to the adjustment of the main shaft, thus effecting a corresponding variation in the inclination of the shaft, for which compensation is provided by the ball and socket eccentric *f*. It is claimed that by this method a greater range of adjustment is secured than is found in other crushers of this type.

Particular stress is laid upon the advantages of the ball and socket eccentric, which is a patented feature peculiar to this machine. The eccentric is housed in a sleeve, *g*, made of two parts bolted together, and runs in a bath of oil, which is always kept above the working parts. Any sediment that may deposit in the oil chamber is drawn off through a drain plug, *h*, in the bottom of the inclosing casting *i*. The eccentric sleeve is encircled at the top by the hub of the bevel gear *j*, which effectually protects the working parts from dust. As an additional protection against the penetration of dust to these parts a packing ring, *k*, is set above the bevel gear, and an upper packing ring, *l*, and dust plate, *m*, are located under the crushing head *n*. Especial care has been taken to provide dust-proof housings for all bearings, a feature of importance in rock and ore crushers because of the damaging character of the rock dust to which they are exposed.

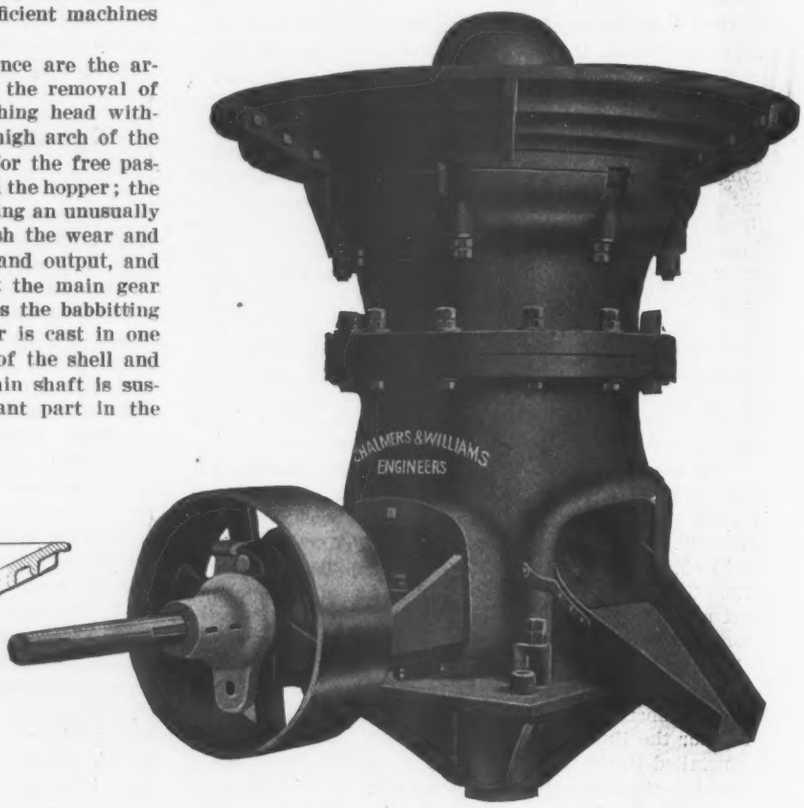


Fig. 1.—The Kennedy Gyratory Crusher Built by Chalmers & Williams, Chicago, Ill.

The machine is belt driven through the bevel pinion *o* and the countershaft *p*, and is constructed throughout with a view to securing a maximum of strength and rigidity; at the same time it is claimed that use of the self-aligning eccentric obviates undue strains to which it might otherwise be subjected. The driving pulley is equipped with keyed or breaking pin connection, as desired, the former being recommended.

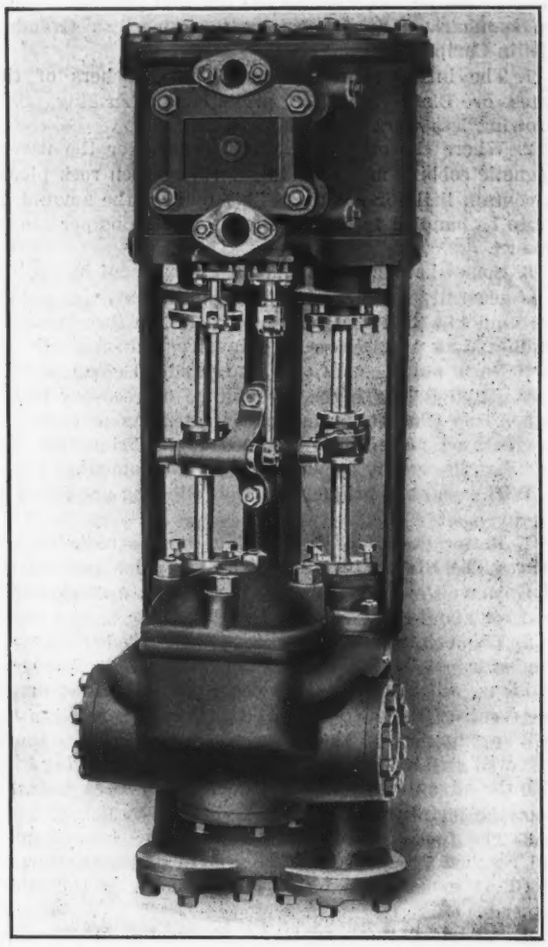
This crusher is built in sizes from No. 1 to No. 12, ranging in weight from 6800 lb. for the smallest to 360,000 lb. for the largest, with capacities for crushing 5 to 10 tons and 600 to 1600 tons per hour, respectively, according to fineness of product and other conditions.

Plans are well under way, and it is expected that a deal will be closed this week, for the consolidation of the Imperial Steel Company, which recently built a crucible steel plant at Imperial Station, near Chagrin Falls, a suburb of Cleveland, Ohio, and the Baldwin Steel Company, which about a year ago built a plant at Charleston, W. Va., for making high grade tool steel.

The Pittsburgh Forged Steel Wheel Company, Pittsburgh, Pa., has increased its capital stock $500,000, making it $1,750,000.

A New Blake-Knowles Vertical Pump.

An inexpensive vertical steam pump of moderate size, adaptable to boiler feeding and general service against high working pressures, is that recently perfected by the Blake & Knowles Steam Pump Works, New York City. It is a vertical duplex double acting pump, as the accompanying illustration indicates, and is especially adapted for use where compactness and strength are of first importance, as in ships and power houses where the floor space is limited.



The New Special Vertical Duplex Piston Pump Built by the Blake-Knowles Steam Pump Works, New York City.

The pump cylinders are of the piston pattern, and are fitted with substantial brass linings. The pump pistons are deep and are packed with fibrous packing suited for hot or cold water. The piston rods are of Tobin bronze. The steam cylinders are of the regular duplex pattern and of similar design to those which have been used for many years in the horizontal Blake-Knowles special duplex pumps. The cast iron cradle or centerpiece which ties the steam and water ends is extremely rigid, an improvement on the ordinary tie bar construction, as it prevents possibility of the cylinders getting out of alignment. The cylinders are ordinarily fitted with brackets for bolting to a bulkhead or wall, but if preferred a special base is substituted so that the pump may be placed directly on the floor.

The pumps are suited for a working water pressure of up to 200 lb. per square inch. They are built in 12 sizes, ranging from 2 x 1¼ x 2¾ in., which has a capacity of 2 to 8 gal. per minute, to 14 x 7 x 10 in., which has a capacity of 245 to 410 gal. per minute.

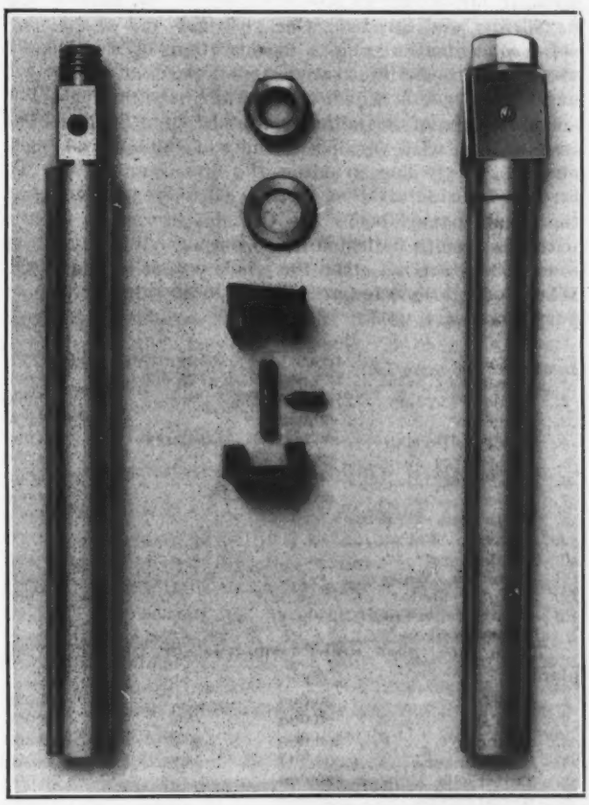
The Buffalo Crucible Castings Company, Buffalo, N. Y., manufacturer of crucible and vanadium steel castings, has appointed Edgar M. Moore & Co., 914 Farmers' Bank Building, as its agents in the Pittsburgh District.

Doubtful Success of Japanese Steel Works.

The Imperial Steel Works, built and operated by the Japanese Government at Wakamatsu, have not been a financial success, according to articles in the British engineering and financial press, in which these works are persistently referred to as an "iron foundry." The lack of iron ore in Japan has been one of the great drawbacks. Ore is obtained from China, and a Chinese mine has been secured recently at an initial expenditure of 1,296,000 yen ($648,000). The high price of coal has been referred to in official reports as another handicap. Changes in the management of the works have been made from time to time, foreign experts being engaged at intervals, and each new management undoing some of the work undertaken under the old. The difficulty of producing commercially acceptable product has been a constant one. Army officials seem latterly to be in charge of the enterprise. One complaint has been that under the conventional tariffs pig iron can be imported at a duty of 5 per cent. ad valorem, and the hope has been held out that by 1912, when the conventional tariffs terminate, the duty on pig iron can be increased. Then, it is argued, pig iron prices can be maintained high enough in Japan to "encourage" the sale of the product of the government steel works. Nothing is said in this connection as to the handicap high prices of steel products would impose on consuming interests. It is stated that from first to last more than 56,000,000 yen ($28,000,000) has been spent on the enterprise. This expenditure covers a period of 10 years.

The Turney Adjustable Reamer.

The Turney adjustable reamer, details of which are shown in the engraving, has a high speed steel head of approximately square cross section with four cut lips formed as left hand spirals of 5-degree angle. The head is made in two sections, each having a channel on the inside, ground after hardening to fit over the squared end of the reamer shank, which preserves alignment of the cutting edges and prevents the possibility of the head turning on the shank. Parallel adjustment of the head



The Turney Adjustable High Speed Reamer Sold by the Grant Nail & Supply Company, Boston, Mass.

sections is controlled by a double end right and left hand screw, which extends laterally through the end of the reamer shank, and engages threaded holes in the reamer head sections. When the adjustment is made a set screw at right angles to the adjusting screw is tightened against the latter, and the head is locked firmly against a shoulder on the shank by a nut and washer at the outer end. The tool is sold by the Grant Nail & Supply Company, 47 High street, Boston, Mass.

While these reamers have only recently been put on the market they have been used in a large machine shop in New England for the past two years, and have made it possible to do away with hand reaming on certain work it had theretofore been necessary to do by hand to obtain smooth holes and preserve standard sizes. It is stated to be no unusual matter to ream 100 holes and upward in bronze 3¼ in. in diameter and 6 in. long, without appreciable wear of the reamer. The tool works in either copper, bronze, steel, cast iron or babbitt. It is simple and strong in its construction, and has the advantage of expanding parallel through its entire length, which increases its length of life, because it is necessary to grind away a small amount only when resetting and grinding are required. The adjustment of the reamer is sufficient to allow for its full wear, until the lips or lands are entirely ground away. It is made in all sizes from 1 to 8 in., inclusive.

Gröndal Concentrates and Briquettes.

A Summation of the Recent Development of This Process.

Data have been prepared recently, showing the extent to which the Gröndal process of concentrating and briquetting fine iron ores has been introduced, particularly in Norway and Sweden. One year ago, out of 19 magnetic concentration plants in operation in Sweden, 12 used the Gröndal apparatus, and now other plants are under construction which will use the same system. The magnetic ores of Scandinavia contain from 30 to 60 per cent. of iron, with varying amounts of sulphur and phosphorus. With fine grinding the iron content can be brought by concentration to from 63 to 68 per cent. At the plants named below the Gröndal process is in use, with the results indicated as to output. Where tons of concentrates are not given the whole output is briquetted. Where only briquettes are given concentrates or fine or purple ores are used:

	Works.	Tons ore treated.	Concentrates	Briquettes.
1.	Strassa	150,000	75,000	60,000
2.	Bredajö	40,000	....	20,000
3.	Herräng	60,000	....	30,000
4.	Guldsmedshyttan	90,000	45,000	30,000
5.	Uttersbergs	24,000	....	12,000
6.	Flogberget	50,000	....	24,000
7.	Lulea	60,000	....	50,000
8.	Sandvikens	....	....	12,000
9.	Horndal	....	....	12,000
10.	Helsingborg	....	....	50,000
11.	Swmavon (Wales)	....	....	36,000
12.	Alquife (Spain)	....	....	40,000
13.	Pennsylvania Steel Co.	200,000	100,000	....

There are also under construction the following plants:

1.	Hellefors	20,000	....	10,000
2.	Vigelsbo	20,000	....	10,000
3.	Salangen	300,000	....	100,000
4.	Sydvaranger	1,200,000	....	600,000
5.	Traversella	50,000	....	25,000
6.	Riddarhyttan	20,000	....	10,000
				755,000

The plant under construction at Sydvaranger will deal with iron ore containing only 38 per cent. metallic iron. A company has been financed by German interests, all arrangements made with the Norwegian Government, and plans perfected whereby a minimum production of 600,000 tons of concentrates annually will be produced, shipments to begin in 1910. The plant will consist of 40 units each containing ball mill, crusher, tube mill and separators. At least 100 separators will be required. It has been found that standard Gröndal ball mills will handle, on an average, 135 tons of hard magnetite ore in 24 hr.

The company at Salangen, Norway, is composed of German ironmasters, who will themselves absorb the entire annual production of 100,000 tons.

Improvements in Practice.

Technical advances of considerable interest have been made in the development of the Gröndal process. These are summarized as follows by the American Gröndal-Kjellin Company, New York:

1. The introduction of heavy rock crushers of the Gates or Blake type for preliminary crushing, thus throwing less work upon the ball mills.

2. Where the ore is of suitable character the use of magnetic cobbing machines to get rid of such rock pieces as contain little or no iron. This reduces the amount of ore to be handled in all subsequent operations per ton of product.

3. Somewhat finer grinding in the Gröndal ball mills. It is generally found that the magnetite particles reduce more quickly than the ganque particles, so that the finer grading does not necessarily involve reducing all the particles to pulpy condition. The practical effect of such finer grinding is a higher percentage of recovery and a higher iron content in the concentrate. As most of the concentrated material is destined to be briquetted, the fact that the grains are smaller is of no moment.

With regard to briquetting, the following are noted as improvements:

1. Better design of briquetting presses reducing the wear. The life of the die plates has been quadrupled. At Cwmavon, working on pyrites residues, a single set is good for about 800 tons of briquettes.

2. The original briquetting furnaces and cars were 1 m. wide. It has been found that this may be increased to 1.5 m. without materially increasing the investment. The result of the change is a 50 per cent. increase in the daily production of the furnace. The furnaces, therefore, will give a tonnage approaching the nodulizing kiln, with the advantage that the briquettes are more desirable from the metallurgical point of view.

3. The fuel consumption, which in the 1 m. furnace had reached 7 per cent. of the weight of briquettes produced, is expected to be further reduced in the wider furnace..

4. Bilbao spathic ore has been treated successfully. The ore was first ground in a tube mill to 0.75 mm. mesh. The mill will grind about 6 tons per hour, using 75 hp. to drive it. The ground ore was mixed with a little water, pressed and burnt in the usual manner. The original ore ran 47 per cent. iron, which with the loss of carbon dioxide in the briquetting furnace brought the iron content of the finished briquette up to 58 per cent.

The fuel economy introduced by the use of the Gröndal briquettes has been ascribed to two leading causes:

1. High iron content and consequent small amount of material to be slagged off.

2. Porosity of briquettes, permitting an enormous surface of contact between reducing gases and iron oxide. This porosity averages over 20 per cent. of the volume of the briquette.

Reference is made to one test of 1000 tons of Strassa briquettes, containing 65 per cent. iron, put through a blast furnace at the Cockerill Works, at Seraing, Belgium, where a fuel economy of 15 per cent. was claimed.

Market Prices.

In the past year the following prices have been paid:

For concentrates containing 63 per cent. iron, for home consumption in Sweden, about $3.65 per ton, on cars at concentrators. For export, containing 65 per cent. iron and about 10 per cent. water, $4.25 at port of export.

For briquettes, f.o.b. port of export, containing 65 per cent. iron, sales have been made at $5.45 per ton, and 10,000 tons have been engaged for Germany for this year at about $5.25, at port of export. Purple ore briquettes from Helsingborg bring about $6 per ton, c.i.f. Stockton.

Pyrites residues briquettes from South Wales works

command from $5.50 to $6.35, delivered, according to cost of transport. These briquettes contain about 62 per cent. iron, with sulphur down to 0.044 per cent.

Results of Gröndal Concentrating and Briquetting.

The accompanying table gives the results from various ores by the Gröndal concentrating and briquetting methods.

	Crude ore.			Concentrates.			Tailings.	Briquettes.		
Ores.	Fe. Per cent.	S. Per cent.	P. Per cent.	Fe. Per cent.	S. Per cent.	P. Per cent.	Fe. Per cent.	Fe. Per cent.	S. Per cent.	P. Per cent.
Bredajo	35.0	0.15	0.010	67.2	0.050	0.004	6.9	61.1	0.020	0.004
Floberget	27.3	0.31	0.003	67.4	0.040	0.003	7.1	65.3	0.007	0.003
Guldsmedshyttan	50.7	3.0	0.003	70.1	0.5	0.002	10.2	68.2	0.010	0.002
Helsingborg (purple ore)	60.6	0.17	....	...	....	....	...	60.6	0.023	....
Herrang	40.2	1.21	0.003	67.3	0.170	0.002	6.4	65.5	0.003	0.002
Hjulsje	39.7	0.12	0.008	67.1	0.035	0.004	10.1	65.2	0.015	0.004
Lulea	58.2	0.110	1.230	71.1	0.015	0.005	12.0	69.3	0.005	0.005
Riddarhyttan*	52.8	0.025	0.006	64.2	0.017	0.003	7.4	...	....	....
Salangen	35.7	0.039	0.23	69.3	0.019	0.009	4.9	...	....	....
Strassa	46.8	0.030	0.015	69.2	0.015	0.003	6.1	67.1	0.005	0.003
Stripa	40.3	0.030	0.010	67.1	0.020	0.002	12.2	65.2	0.005	0.002
Sydvaranger*	38.0	0.066	0.030	68.3	0.026	0.014	5.5	68.0	0.006	0.014
Uttersberg	34.5	0.020	0.024	62.6	0.020	0.016	9.3	...	....	....
Vigelsbo*	35.2	0.45	0.026	64.6	0.089	0.002	6.7	...	....	....
Cwmavon	61.43	1.65	0.019	...	....	....	...	61.5	0.044	....

* Under construction.

Briquettes containing from 63 to 65 per cent. metallic iron, low in sulphur and phosphorus, and easily reducible in the blast furnace with economy of fuel, would be superior to the average run of old range Bessemer ore of the Lake Superior region, on which the guarantee is now 55 per cent. iron. The present price for such lake ore is $5 per ton, delivered at Lake Erie dock. In European and American markets, it is stated, Gröndal briquettes would command a price of 10 cents a unit, or $6.30, delivered. The Swedish companies using the process have formed the Iron Export Association, whose products find a ready market in Europe. It is said that every operating company has been a financial success. The average cost of concentration on an output of 200 tons daily in the United States or Canada, on ores of which 2 tons would be needed per ton of concentrates, is estimated at 40 cents a ton of concentrates. The average cost of briquetting, on 200 tons daily, is put at 45 cents a ton.

The Philadelphia Foundrymen's Association.

The regular monthly meeting of the Philadelphia Foundrymen's Association was held on the evening of April 1, Horace L. Haldeman presiding. During the business session membership was authorized in the American Anti-Accident Association, of which Thomas D. West, Sharpsville, Pa., is president. W. S. Hallowell, who, together with A. A. Miller, represented the association at the meeting of the so-termed "Short Weight Committee" of foundrymen, shippers and transportation interests, reported progress, and announced that a formal report would be presented as soon as the proceedings of the committee had been edited and formally presented to H. A. Carpenter, chairman of the General Committee. Copies of the report will thereafter be printed.

Announcement of the recent death of three members of the association was made by the secretary, these being George V. Cresson of the George V. Cresson Company, J. K. Bougher of the J. W. Paxson Company and William H. Pfahler of the Model Heating Company. Resolutions of regret were adopted. W. S. Hallowell, John A. Penton and H. L. Haldeman made brief addresses, eulogizing particularly Mr. Pfahler, who was one of the originators of the National Founders' Association, in which he took a very prominent part, and who was one of the most conspicuous foundrymen in the United States.

The Gardner Eight-Hour bill, the Anti-Boycott bill and other labor bills now before Congress were discussed, and a resolution was adopted instructing the secretary to protest to the House Labor Committee in the name of the association against the adoption of these bills.

An informal discussion on the general foundry trade followed, after which a luncheon was served.

The Pittsburgh Traffic Club Dinner.

The sixth annual dinner of the Traffic Club of Pittsburgh was held in the Hotel Schenley, on the evening of April 3. It was the most successful function from every point of view yet given by this organization, a total of 560 persons being in attendance, including a number of special guests, among whom were Robert Mather, president of the Rock Island Company; Dr. Woodrow Wilson, president of Princeton University, and Nathaniel Ewing, chairman of the Pennsylvania State Railroad Commission. In the morning of that day, a special train of the Pennsylvania Railroad conveyed the party to the plants of the Westinghouse Machine Company and Westinghouse Electric & Mfg. Company at East Pittsburgh, and Westinghouse Air Brake Company at Wilmerding, Pa., luncheon being served at the last named plant. A considerable number visited the Homestead and Edgar Thomson works of the Carnegie Steel Company, the process of rolling rails being witnessed at Edgar Thomson. The club has been of great benefit to its members, and is in a most flourishing condition, with its membership steadily increasing. William Hodgdon, freight traffic manager of the Pennsylvania Lines, acted as toastmaster at the dinner. W. B. Everest, traffic manager of the Westinghouse Electric & Mfg. Company, is president of the club. Mr. Everest delivered an able address on "Industry, Transportation and the Traffic Club;" Dr. Wilson spoke with characteristic force on "The Government and Business," and Mr. Mather delivered an address on "Railroad Regulation," which is worthy of wide circulation. Souvenirs presented to the guests included a handsome cigar tray and ash receiver from the American Sheet & Tin Plate Company, and a nickel railroad spike paper weight from the Jones & Laughlin Steel Company.

Scientific Instrument Makers Consolidate.

The Bausch & Lomb Optical Company, Rochester, N. Y., has incorporated with a capital stock of $600,000, with the following directors: John J. Bausch, Henry Lomb, Edward Bausch, Henry Bausch, William Bausch, Carl F. Lomb, William A. E. Drescher, Adolph Lomb, Henry C. Lomb, George N. Saegmuller of Rochester, and Rudolph Straubel of Jena, Germany. The incorporation is the outcome of a recent association formed by the Bausch & Lomb Optical Company and the Bausch-Lomb-Saegmuller Company of Rochester, N. Y., and the Carl Zeiss Optical Works of Jena, Germany. The combination of these three manufacturers of scientific instruments is important, in that it concentrates the knowledge, skill and experience of well known companies in the same class of manufacture. Under the new corporation the Bausch-Lomb-Saegmuller Company becomes an integral part of the Bausch & Lomb Optical Company, losing its identity as a separate corporation. The Carl Zeiss Optical Works becomes a member of the new organization, and it is the intention of the new company to manufacture certain products of the works in the United States, but the Zeiss Works in Germany retains its identity as a separate corporation.

THE IRON AGE

Established in 1855.

New York, Thursday, April 9, 1908.

Entered at the New York Post Office, as Second Class Mail Matter.

DAVID WILLIAMS COMPANY, - - - - - PUBLISHER
14-16 PARK PLACE, NEW YORK

DAVID WILLIAMS, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - TREASURER
GEO. W. COPE, - - - - - SECRETARY

CHARLES KIRCHHOFF, - - - - - - - - } EDITORS.
GEO. W. COPE, - - - - - - - - }
A. I. FINDLEY, - - - - - - - - }
RICHARD R. WILLIAMS, - - - - - - - - HARDWARE EDITOR.

The First Quarter of 1908.

Since the iron trade has entered upon the second quarter of the year it might be presumed that more data are at hand for an estimate of the place 1908 will take in iron and steel consumption than were available three months ago. It cannot be said, however, that the course of trade since the year opened has been conclusive in any respect, unless it has modified the views of those who looked for a quick return to confidence and prosperity. Optimism has been the prevailing sentiment among iron and steel manufacturers, as it has been in practically all manufacturing and commercial lines. So far as published utterances go, the contrary sentiment has been almost entirely confined to railroad interests, the effect of legislation and of national administrative policies upon the ultimate attitude of capital toward railroad securities being still a chief factor of uncertainty.

The five months since the panic of October have furnished the railroads some basis for gauging the extent to which, without reduction in wages, they may be able to adjust their expenditures to materially shrunken incomes. For reasons that have had wide publicity, railroad wage reductions are not this year, as has been the case in after-panic months heretofore, the line of least resistance in the effort to make readjustments. To what extent that fact will accent the abstinence of the railroads from purchases of iron and steel is yet to be seen. Marked as the policy of cutting such expenditures has been in other times of recession, the peculiar conditions surrounding the railroad situation now may lead to even a more drastic enforcement of economies than, for example, in the mild reaction of 1904. With fixed charges and wages undiminished, all construction work, except that on which there would be greater loss by postponement, has been stopped; expenditures for new equipment have been suspended, and it is estimated that under the policy of putting damaged rolling stock out of commission the amount of equipment now in yards is more than twice the ordinarily allowable maximum. Of course, the economizing policy will one day pass the point of economy and then money will be spent to prevent serious waste of property. But that phase of the railroad situation has not yet arrived.

So far as the money side of the present trouble is concerned, we are plainly some distance from the point at which even the stronger railroad companies will think of attempting to float loans with the general public. Many plans of this sort involve the refinancing of expenditures of which the iron industry has already had the benefit.

Within the iron trade itself the conditions have been so unusual that comparisons with other panics are difficult. The customary measurements in such times are taken from market prices. But as is well known, prices do not tell the story now. Looking to production, the pig iron statistics show a gradual increase in the first three months of the year. From 33,718 tons a day in January, the output of coke and anthracite pig iron was 37,163 tons in February, and 39,619 tons in March, against an average of about 72,500 tons a day in the 10 months ending with October, 1907. The gradual nature of the increase is only in line with what was noticed in the early months of 1894, which was likewise a year following a panic. From having averaged 25,000 tons a day for six months preceding the panic of 1893, coke and anthracite pig iron production fell to a rate of 10,000 tons a day in October, the month of lowest output in that year, and by January, 1894, it had advanced to 14,000 tons a day, which was also the rate in February, while March showed an advance to 15,700 tons a day.

A general parallel between 1874, 1894 and 1908 has been established by the developments in the first quarter of this year, according to the New York *Evening Post*, which follows the citation of statistics with this comment:

> It is safe to predict that nine out of ten readers will be astonished, and some of them perhaps a little incredulous, over the discovery that the outward and visible signs in American finance these past three months, during which we have repeatedly been talking of "immediate return to former conditions," have in reality done nothing more than duplicate closely the events which characterized the same period after other panics. We are a little apt, in taking a retrospect of the completed sequel to such financial crises as those of 1873 and 1893, to imagine that the community was plunged for months and years in a gulf of depression and pessimism, into which no ray of light intruded until the hard times had reached their distant end. But this was certainly not so. The men of 1894 and 1874 were the same in temperament as the men of 1908; they were optimistic by nature, and they grasped at every chance of indulging optimism, of which there were many in the vicissitudes of trade. There were hasty predictions then that all of the period of reaction was over, and that the "boom times" were about to begin again. So far as the longer future was concerned, such ideas were well founded in those earlier years, and they are well founded to-day.

Whatever the disagreements as to the duration of the present depression, an encouraging feature is the general belief that while the progress to recovery may not be even-paced, the low point in consumption has been passed. Since the malady from which the country is suffering has so large a mental side, the time element in recovery is important, as it has been in other cases where confidence has been temporarily lost. On the other hand, it is well to give full weight to the important changes from conditions existing in other depressions, changes which should tend toward the more rapid rebuilding of the foundations of sound business.

Responsibilities of Machinery Buyers.

The question is constantly arising as to the time and money a machine builder should spend with a customer in getting a tool running up to the specified standard, where the fault is in the customer's works. There is no dispute, of course, concerning the responsibility of the builder, where something is wrong with the tool itself. But the usual complaint is due to the ignorance or negligence of the buyer's superintendent or foreman, and sometimes results in a serious burden to the builder if he assumes the expense, which may be sufficient to eat into the price to a point even below that where profit begins. This is a phase of the general question of the responsibility of the manufacturer.

A machine tool is shipped with careful directions as to its setting up and operation, including speeds and

feeds, based on the speed of the countershaft. The tool is put into use and then comes a complaint that it will not do the work promised by its maker. The latter sends an expert to investigate. The distance may be hundreds of miles and the bill for traveling expenses proportionately heavy, in addition to the item of wages. The expert finds that the directions regarding the machine have been disregarded. The countershaft speed may be but half of that required to give the designed efficiency, or it may be very much too great. There is no doubt that an impartial referee would decide that the customer should reimburse the builder for the expense entailed in correcting the trouble, yet the customer nearly always rebels at the bill.

These instances are numerous. In one case a special grinding machine was installed in the works of a customer, and after a time trouble was met in its operation. A man sent to investigate found that the exhaust fan furnished with the machine to remove grit and dust during dry grinding had been installed on another machine of an entirely different type, and that this obvious means of protecting working parts had never been applied as intended. In another case a complaint received from a customer located 1000 miles from the shops of the builder, that the machine would not grind to exact size, brought out the fact that no one had ever thought of the necessity of truing up the grinding wheels, though the directions sent with the machine included this warning printed in conspicuous capitals. Every machine tool man can probably relate numerous similar experiences.

In the past the customer has usually had the better of the controversy in the settlement of expense resulting from the faults of his own shop. But manufacturers and dealers are now breaking away from the custom and are standing more firmly by their rights. As soon as they have established this attitude toward their trade customers will go at the matter in a different way. They will then hold their mechanical men more strictly accountable, which should, of course, be done.

The foreman or superintendent (the latter should either supervise or, after careful examination, pass his approval on the installation of new machinery) can have no excuse for making the blunders that occur so frequently. If the foreman does not understand a machine, if there is any doubt concerning any part of its mechanism or arrangement, the builder is always glad to lend a helping hand. It is for his interest to do so, and the customer realizes that he has the right to call for any assistance of the sort that may be needed. Every modern establishment has a speed indicator, so that there need be no doubt as to a tool being driven at the proper speed. If after the machine is started up it will not run according to its guarantee, the mechanical man of the shop should be able to determine whether the fault is his own or that of the builder. In most cases of unwarranted complaint the trouble is due not so much to ignorance as to indifference. The responsible head of a department does not take the trouble to look into the matter as he would into some detail of his own product, but instead of that he immediately calls upon the builder, summarily condemning the machine and its designer. Usually the customer will back up his own man. If, however, he would call the responsible person sharply to account there would probably be fewer complaints.

Some machinery builders make it a practice to detail a special man to set up each machine or group of machines in the customer's works. It is an excellent practice, a wise safeguard, especially where there is something radically new in the tool or its application. The customer pays the bill because the additional expense must be reckoned in with the other items of general cost. But even after a machine has been installed by an expert and its operator carefully instructed, the possibilities of trouble are by no means eliminated. Changes are made or directions disregarded and the builder receives a complaint that the machine is not working up to expectations. This has been known to happen after a year or more of successful operation, and, though the customer be in the wrong, he still expects, or at any rate claims, that he should not be called upon for any of the expense, or at most that the builder should share it.

In this connection it may be stated that some machinery builders and dealers are altogether too easy with their customers. They are fearful of losing future orders. As a matter of fact, sound business methods pay in dealings with buyers. A business man respects the house established on a basis of principles by which it stands. Occasionally a customer is heard to comment on this fact, relating his own experiences. A product is sometimes "sized up" by the lax system of its manufacturer; the presumption is created that this weakness extends to the manufacturing department, and consequently to the goods. The machine builder should always be quick to remedy defects for which he is responsible, but resolute in refusing to meet expense for the cause of which he is not to blame.

A Latent Strength in the Business Situation.

A matter of constantly accelerating interest to manufacturers in many branches of the metal trades is the extraordinarily numerous inquiries which they are receiving from all parts of the country, but which usually bring no immediate results in orders. It makes little difference where the seeker for information may go, the answer of the manufacturer is nearly always the same. He tells of an unusual volume of inquiry—requests for prices and for general information concerning his products—but of the failure of the most persistent follow-up methods to convert inquiries into orders. Naturally the opinion prevails that customers are simply holding off for a little while until they can see more clearly into the future of their business. Usually the conventions of the great political parties are named as the probable turning point, or the Presidential election itself, with its simultaneous choice of the next House of Representatives. It is the universal hope that after the nominations are made the result may be discounted, with beneficent results in restoring confidence and converting inquiries into the tangible reality of new business.

The older manufacturers assert that there is no precedent for this widespread revelation, during a period of business inactivity, of actual wants of customers. To be sure, not all of the inquiries can be considered as being backed by a serious intention of buying later. Customers, however, have had the time to think of many things in connection with their business to which a year or so back they could give little heed, while their works were rushed to the extreme of production. Now they are figuring on possible improvements, such as additions to equipment or the replacing of the old; or they may be studying the matter of raw materials with the idea of improving the quality or reducing the cost or extending the scope of their products. In investigating their individual conditions they must seek information regarding many things, and hence a certain number of such requests will never develop into orders. But probably by far the greater percentage of inquiries means plans actually made to buy.

It is conservatively stated that if three-quarters of the inquiries received since January 1 should all at once materialize into orders, say during April, a most powerful impulse would be given to manufacturing. It is certain that if this impression of the ultimate conversion of inquiries into orders is a correct one, a great latent strength exists in the situation in this known business alone.

Car Statistics Less Unfavorable.

BY R. L. ARDREY.

The latest bulletin of the American Railway Association, issued under date of April 1, to show car surpluses and shortages of all railroads on March 18, indicates that the traffic of the country is slowly recovering from trade depression. The total number of idle cars reported was 297,042, compared with a total of 343,928 February 5, the date when the carriers reported the largest surplus.

The Character of the Surplus Cars.

The number of idle or surplus cars March 18 was equal to about 15 per cent. of the total equipment, as the roads have in service about 2,000,000 cars. This statement should be qualified by the explanation that the railroads have a larger number of bad order cars than under ordinary conditions. Cars requiring only slight repairs, which can be made on the tracks, are reported in the surplus, but "shop" cars are not included, and it is understood that the carriers have about 5 per cent. more than the normal number of cars awaiting shop repairs. The following table shows the character of the surplus cars reported March 18:

Box cars	103,509
Flats	25,122
Coal, gondola and hopper	119,205
Other kinds	49,206
Total	297,042

The railroads have approximately 1,000,000 box cars in service, and the reports would indicate that the surplus is only 10 per cent. of the total. Allowing an additional 5 per cent. for cars awaiting shop repairs, in excess of the normal number, it would appear that 85 per cent. of the box car equipment of the country is in service. This is a far more favorable showing than the public has been led to infer from the publication of these reports in the daily press. Shippers who have personally observed the large accumulation of idle cars, especially in the Eastern and Central States, may be inclined to question the accuracy of the figures, as it would not be unusual, even under ordinary trade conditions, for the railroads to have 15 per cent. of idle equipment at this season of the year. These statistics, however, are compiled with unusual care.

Why the Statistics Are Reliable.

The American Railway Association is the most important organization of railroad interests in the country, comprising all the lines of any magnitude. The active members are the high operating officials of the roads, and the business of the association is to fix the standards and rules which are universally followed in railroad operation. The Committee on Car Efficiency, which compiles car statistics, has expended more than $100,000 in the past year in collecting data regarding car movement and management. The purpose of this investigation, which began a year ago in January, was to obtain all the facts relative to "car shortage," and with this end in view the experts in the employ of the committee have obtained at regular periods from all the railroads data regarding the number of cars in service the daily average movement and car earnings on each line, the surplus and shortage of cars, and many other points of great importance in railroad operation.

The statistics of car surplus and shortage are handled with especial care, with a view to promoting traffic by making the idle cars of one road or district available in other territory where there may be a shortage. Incredible as it may seem, especially in iron and steel circles, it must be accepted as a fact that only 15 per cent. of the car equipment of the country is idle at the present time. There may be reasons for accepting the prediction of Commissioner Lane at Washington that there will be a car shortage in October.

The Suffering Iron and Lumber Industries.

The iron and lumber industries have suffered the most acutely from the depression of recent months. These two industries furnish directly about 15 per cent. of the total tonnage carried by railroads, and indirectly the iron industry controls a large additional tonnage of coal and coke. The depression in these industries will come very near to accounting for the surplus of idle cars and a corresponding loss of the railroads in gross earnings. Looking a little farther, we find that the railroads use almost as large a share of the production of lumber as they use of iron and steel. Sales of lumber for railroad use in the first three months of the present year are estimated at less than 10 per cent. of the value for the corresponding period a year ago.

During the calendar years 1906 and 1907 the railroads placed orders for more than 450,000 freight cars, along with corresponding expenditures for other renewals and improvements. The ordinary expenditure for maintenance of way and structures and for maintenance of equipment amount to more than $600,000,000 a year, without including new construction or additions to equipment. In view of these facts, it is not difficult to locate the reason for the 15 per cent. of idle cars, and the depression in the iron, steel and lumber industries, and the sympathetic distress in other lines.

After ordering 450,000 cars in two years, the railroads, as shown by statistics of the American Railway Association, were short some 90,000 cars in October, 1907. Next fall they will have fully 100,000 less cars in service, allowing for the number that will have been scrapped by that time, and also for the number that will go to pieces under the heavy strain of moving the crops. In the past couple of years the grain crops have fallen a little below the average in tonnage, and in the ordinary course of nature, with the interest of the farmer stimulated by the high prices that have prevailed for corn and wheat, crops may be considerably larger than the average this year. Winter wheat has come through the trials of the winter and spring months in good condition.

New Control of the Bristol Company.

Prof. Wm. H. Bristol, inventor of the recording instruments, steel belt lacing and other products which have been manufactured by the Bristol Company, Waterbury, Conn., since it was first organized in 1889 as "Bristol's Mfg. Company," has acquired control of that company, now owning the majority interest, and assumed active charge of the management Friday, March 28. Two years ago Professor Bristol withdrew from the presidency of the company, and since has developed several new inventions, including electric pyrometers and smoked chart recorders. The business established at New York to handle these under the name of Wm. H. Bristol will be consolidated with the Bristol Company, giving the latter what is probably the most complete line of recording instruments in the world for pressures, temperatures, electrical measurements, &c. The standard Bristol recording thermometers cannot be successfully used for temperatures above 600 degrees F., but supplemented by the Wm. H. Bristol pyrometers, which are suitable for temperatures of from 600 degrees to 2600 degrees F., instruments will be available for a much wider range. The new lines of Wm. H. Bristol pyrometers are fitted with special movements made by the Weston Electrical Instrument Company, and are designed for extremely accurate measurements. Professor Bristol has taken out a number of patents during the last three years on new instruments. One of these, which will soon be put on the market, is a long distance electric thermometer, designed especially for indicating and recording at some central station refrigeration, atmospheric and drying temperatures at several distant points.

The Metallurgy of Iron and Steel.*

A book on iron and steel works practice, bearing a 1908 imprint, has a distinction in being able to deal with development through an unusual period in a most important field. But Professor Stoughton's work is unique in a more important way, for it is the first to cover fully the processes of both iron and steel manufacture and the constitution of these metals. The author set out to produce an iron and steel text book for students in metallurgy. He has succeeded well in that purpose and has also furnished a comprehensive reference work for those engaged in related fields of engineering. With all the literature on iron and steel the past seven or eight years have produced, there was a place for one more work. Turner's "Metallurgy of Iron" and Harbord's "Metallurgy of Steel," with its section by Hall on the "Mechanical Treatment of Steel," were excellent, and along with Campbell's "Manufacture and Properties of Steel," carried forward the record of Henry M. Howe's monumental work on steel published 18 years ago. With all the large space given by Turner and Harbord to American practice, their atmosphere and view point were essentially British. Campbell's work left little to be gathered up by those who came after him, particularly any attempting to deal with open hearth development. Yet Professor Stoughton judged rightly the field that remained for an iron and steel text book. His experience as adjunct professor of metallurgy in Columbia School of Mines, which acquainted him with the need, also contributed much to his ability to meet it. Those who help to make history on the operating side of the industry rarely make literature. Sir Lowthian Bell was one of few conspicuous exceptions.

To meet the mechanical limitations of a text book price, as well as the editorial demand for compression into text book proportions, put no small task upon the author of the present work. Occasionally an illustration is inadequate, through reduction to too small a scale, but there are more than 300 of them, and as a rule they are creditable, and type and paper are good.

The mechanical features of iron and steel manufacture are given an important place in the description of processes. This is true of the iron and steel foundry as well as of the blast furnace, steel works and rolling mill. One chapter of 50 pages is given to the "Mechanical Treatment of Steel." The introduction deals with "Iron and Carbon," and contains a number of important definitions. Then comes a chapter on the "Manufacture of Pig Iron," in which naturally prominence is given to blast furnace construction, the reactions in the furnace, charges, slag, &c. As illustrating the method of treatment, the following extract is made, being the author's summation of the development with dry blast, without doubt the most noteworthy advance of late years in blast furnace operation:

Drying the Blast.—The water vapor blown into the furnace (derived from the moisture of the air) is equivalent to from ⅓ to 2 gal. of water per 10,000 cu. ft. of blast, or 1½ to 8 gal. per minute, depending on the humidity of the atmosphere. Though this steam is as hot as the blast, it materially cools the smelting zone of the furnace by dissociating there:

$$H_2O = H_2 + O \text{ (absorbs 58,060 calories)},$$

or 1 lb. of steam absorbs 7,110,000 calories. The hydrogen and oxygen reunite in a cooler part of the furnace and return the same amount of heat, but this does not compensate for that taken away from the smelting zone, where it is most needed. For this reason a few American plants, and at least one in England, have adopted James Gayley's expedient of drying the air by refrigeration before it is drawn into the blowing engine. This results in greater regularity of furnace working and valuable saving in fuel. In fact, so great is the economy shown in this respect that there was a tendency at first to receive the results with skepticism. J. E. Johnson, Jr., has explained this saving, however, in a very ingenious and skillful manner, by showing that every blast furnace has a certain "critical temperature," below which it will not perform any smelting, and that the theoretical temperature of combustion of the smelting zone is only a little above this "critical temperature." To increase this small interval between the two, therefore, greatly increases the "available heat," though the change in nominal temperature be small. If further explanation of this argument is needed it may be found in the following simile: Water boils at 212 degrees F. If the temperature of a boiler is 262 degrees there is a certain pressure of steam; if we increase the temperature only 50 degrees we double the pressure; yet 50 degrees appears small in comparison to 262 degrees.

The Conversion of Pig Iron.

Under the caption, "Purification of Pig Iron," is a chapter introductory to the detailed descriptions of processes resulting in the manufacture of steel and wrought iron. The author estimates that about 3 per cent. of the pig iron produced in the United States is remelted and converted into malleable cast iron, and that about 20 per cent. is remelted and cast as gray iron. Thus 77 per cent. undergoes purification to become wrought iron, Bessemer steel, open hearth steel or crucible steel. Taking the pig iron output of the country for 1906—namely, 25,307,192 tons—a diagram is given showing that of the estimated 77 per cent. entering into steel and wrought iron, 52 per cent. passed through Bessemer converters, 20 per cent. went to basic open hearth furnaces, 2 per cent. to acid open hearth furnaces and 3 per cent. to puddling furnaces. Of this last 6 per cent. is assigned to crucible steel production. The amounts of scrap employed in the various processes are estimated at 25 per cent. in the iron foundry and 50 per cent. in the open hearth process, while 800,000 tons of pig iron is assigned to wrought iron for a production of rolled iron products reaching in 1906 a total of 2,186,557 gross tons. This would mean that of the rolled iron product of that year 40 per cent. was from muck bar iron, a figure doubtless above the actual, for the scrap pile is more than a 60 per cent. factor here. On the other hand, the allowance of 500,000 tons of pig iron for 1,321,613 tons of acid open hearth steel seems small.

The chapters on the various steel making processes give an excellent presentation of essential features. The special processes, the Talbot, Monell, Campbell No. 2, Bertrand-Thiel and the Duplex are treated briefly. It is stated that while the first 200-ton Talbot furnace at the Jones & Laughlin Steel Company's plant cost $1,000,000 to build, with the present experience they can be installed for about one-fourth that sum. What is said of the Duplex process, which is now worked with pronounced success at Ensley, Ala., will require some revising in future editions. The Ensley practice has upset the theoretical calculations that the waste of iron is almost double what it would be in one process if worked alone. Moreover, independence of the scrap market was a necessity at Ensley, and the "method adopted of getting the equivalent of steel scrap" is not "costly," as the author intimates, in comparison with what would be encountered in the employment of the open hearth process by itself. It may be said also that the results at Pueblo, Colo., confute the theoretical figures as to loss of iron from the joint use of the converter and the open hearth furnace.

Iron and Steel Founding.

Professor Stoughton presents a better résumé of American foundry practice than is contained in any preceding work dealing generally with the metallurgy of iron and steel. The illustrations are sufficient to give a comprehensive idea of molding operations. The author's experience with Bessemer steel casting plants prompts him to give a relatively fuller statement of the case of the small converter and the long tuyere modification that has somewhat reduced the waste of metal. There is no disposition, however, to minimize the greater loss in the Bessemer than in the open hearth steel foundry, the Tropenas converter being charged with 17 to 20 per cent. loss of the metal going into the cupola, while the long tuyere side blown converter is said to reduce this to a range of 14 to 16 per cent. Malleable cast iron also receives fuller treatment than in any previous general work, particular attention being given to the composition of the pig iron and the effect of changes in the various metalloids. The expansion of malleable castings under annealing is referred to in an interesting paragraph: "When malleable cast iron is annealed and the temper carbon precipitates, the casting expands to an amount approximately equal to that which would have occurred

* "The Metallurgy of Iron and Steel." By Bradley Stoughton, adjunct Professor of Metallurgy, School of Mines, Columbia University, New York. Pages, 500; 6 x 9 in. Illustrations, 309; tables, 34. Price, $3. Published by the Hill Publishing Company, New York.

if the graphite had separated during solidification, and gray iron had been produced in the first instance. In other words, the temper carbon, although in a very finely powdered condition, occupies about the same amount of space as an equal weight of graphite and causes about the same ultimate difference in size between the original pattern and the annealed casting as when gray cast iron is made."

Heat Treatment and Alloys.

A particularly interesting part of the book is that comprising the chapters on the "Solution Theory of Iron and Steel," "Heat Treatment of Steel," the "Constitution of Steel," "Alloy Steels," "Corrosion of Iron and Steel" and those dealing with electro-metallurgy and metallography. The results of recent investigations in the field first covered in any permanent publication by Professor Howe's "Iron, Steel and Other Alloys," are presented lucidly and comprehensively. The most recent theories of the properties of steel as affected by impurities are explained, and the importance of the structure of steel emphasized.

In the chapter on corrosion the author takes issue with some of the popular teaching as to the relative corrodibility of iron and steel. To the general belief that steel corrodes much more rapidly than wrought iron, he opposes the results of many scientific tests showing the difference between the two to be very small, though favorable to wrought iron in the case of sea water and alkaline water and to steel in the case of acids and acidulated water. The assertion that manganese in steel causes an increase in the rate of corrosion, he says, is based on no reliable evidence. Referring to the usual method of testing corrosion, by noting the loss of weight of the metal, the author suggests that the pitting to which badly made material is subject is not sufficiently taken account of in such comparisons, since one thin spot might be disastrous, though representing a relatively small loss in weight.

On electric smelting the author's statements are properly conservative, though he gives full validity to the claims made for electric refining furnaces as competitors of the crucible steel process. As to the cost of electric production of pig iron, this is said:

> It seems unwise to quote figures except where the full circumstances and conditions are described, although we may estimate that the cost of smelting may be as low as $10 per ton of pig iron produced under the most favorable circumstances and up to $30 per ton where ore and water power are not so cheap. The expense depends chiefly upon the cost for the production of electricity, and this is so large that electric smelting is practically never advisable except where impure ore and water power for the production of electricity are very cheap, and where pig iron, coke and pure ore are expensive. Besides the advantages of being able to produce a very pure pig iron and to employ very impure ores, we can use electric smelting even where coke is not available by the use of charcoal as a reducing agent.

A chapter on "Chemistry and Physics Introductory to Metallurgy" is given at the end of the book, for the benefit of those who take it up without technical training.

The index is scarcely as full as might be expected. The Taylor gas producer is indexed, for example, but not the Taylor-White process for high speed steels, though a page is given to the latter. "Recalescence" is not indexed, and so far as our reading goes, is not defined in the book. Moreover, confining our reading to the passages on "critical temperature" cited in the index, we find a less clear and adequate elucidation of the subject than one would expect in a text book. But perhaps points relatively so unimportant ought not to be brought forward, when the author has produced a work that in its length and breadth is so commendable and represents such command of the best practice in the manufacture of iron and steel.

The Electrochemical Society's Meeting.—The annual meeting of the American Electrochemical Society will be held Thursday, Friday and Saturday, April 30 to May 2, at Albany, N. Y. Many interesting papers have been announced. Friday will be spent in Schenectady in an inspection of the General Electric Company's works and Saturday in Troy. The headquarters will be at the Hotel Ten Eyck. Further particulars may be had from Alois von Isakovics, secretary-treasurer, Monticello, N. Y.

Labor Legislation in 1907.

The Massachusetts Bureau of Statistics of Labor gives in its *Bulletin* for March and April a summary of labor legislation in the United States in 1907. In that year, it is stated, such legislation probably exceeded in volume, importance and diversity the record of any previous year. In the 43 States and Territories in which legislative sessions were held last year 397 labor measures were passed, of which 245 were new acts and nearly all the remainder amendments of earlier statutes. Measures for the employment of children were passed in 28 States, and eight legislatures passed acts governing the employment of women. The new child labor laws passed in Alabama, Arkansas, Florida, Idaho, Minnesota, Missouri, Montana, Nebraska, North Carolina, South Carolina and Tennessee indicate a disposition on the part of these States to come into line with the movement for legislation regulating the employment of children in the manufacturing States of the country.

Much of the legislation affecting the hours of labor of employees related to child labor and employment of women; but eliminating such acts 23 legislatures passed laws regulating the hours of labor of other employees. In 11 cases acts were passed limiting the hours of labor of employees engaged in the movement of trains. In nine States the maximum was fixed at 16 hours and in two States at 14 hours. In 10 States the hours of labor of railroad, telegraph and telephone operators and train dispatchers were limited by new statutes. Laws and amendments restricting the hours of labor of public employees were passed in eight States and Territories; hours of labor in mines, in two States; hours of labor of drug clerks, in one State.

A considerable number of acts was passed relating to the inspection of factories and the protection of workmen. In 19 States laws were passed relating to employers' liability and to the procedure for recovering damages, the majority of these acts referring particularly to the liability of railroads. Acts for the encouragement of immigration were passed in Minnesota, Nevada, New Mexico, South Dakota, Tennessee, Wisconsin and Wyoming. In 13 States acts were passed relating to technical education, these being in four cases for the establishment and maintenance of a particular school of high order, while in four other States permissive acts provided for the establishment of local technical or trade schools. Special educational commissions were appointed in Illinois and Massachusetts. Legislation relative to the payment, assignment and garnishment of wages of employees and the establishment of wages as preferred claims was enacted in 19 States.

The Milwaukee Car Mfg. Company has recently completed its new plant at Milwaukee, Wis., and has commenced the manufacture of freight cars, being equipped with facilities to turn out eight cars a day. It has a main building 82 x 286 ft., separated into two sections by a fire wall, in which are located the wood mill and machine shop, as well as the erecting shop; a smith shop, 50 x 61 ft.; a power house, 44 x 71 ft.; a storeroom and office building, 32 x 90 ft., and an additional building, 27 x 29 ft. The buildings are of substantial construction with steel truss roofs. The most modern machinery has been installed. The smith shop equipment consists of large shears and punches and heavy forging machinery, including a 1500-lb. steam hammer and a Bradley hammer. A complete outfit of specially designed furnaces has been installed, in which crude oil is used for fuel. A receiving tank of a capacity of 12,000 gal. has been provided for the storage of the crude oil. The company starts with good orders on its books.

Charles G. Smith & Co., Park Building, Pittsburgh, have secured the agency in the Pittsburgh District of the Prentice Brothers Company, Worcester, Mass., for its line of radial drills, drill presses, &c.

The Alabama Consolidated Coal & Iron Company.

The eighth annual report of the Alabama Consolidated Coal & Iron Company presents the following statement of earnings for the fiscal year ending October 31, 1907:

Gross sales (to the public)			$2,585,541.55
Manufacturing and producing cost and operating expenses, including regular provisions for blast furnace relining and repairs amounting to $59,917.24			1,948,505.41
Gross profit			$637,036.41
Miscellaneous earnings and other income:			
Commissary net earnings		$92,542.38	
Gross sales	$586,327.45		
Cost of merchandise	454,525.15		
Gross earnings	$131,802.30		
Less—expenses	39,259.92		
Net earnings (as above)	$92,542.38		
Rents received (gross)	$56,056.92		
Less—expenses	33,166.50	22,890.42	
Unclaimed wages and miscellaneous credits		2,931.85	
			118,364.65
Total earnings and income from all sources			$755,401.06
Less — expenses and miscellaneous charges:			
Selling commissions and other expenses		$65,311.13	
Commercial interest and discount		3,553.15	
Legal expenses		7,246.63	
Bad debts and reserve for doubtful accounts		2,116.25	
Bond discount and expenses written off, less premium on bonds redeemed		972.50	
Examining properties and prospecting		12,877.07	
Adjustment of inventory values and flood expenses written off		5,338.44	
			97,415.17
Net earnings from operations			$657,985.89
Deduct — fixed and provisional charges:			
Provision for depreciation and accruing renewals		$150,000.00	
Provision for exhaustion of minerals		35,332.62	
Bond interest		113,775.00	
Dividends on preferred stock		87,500.00	386,607.62
Surplus net earnings for the year			$271,378.27

The balance sheet, as of October 31, 1907, is as follows:

Assets.

Land, buildings, plant and machinery acquired	$4,739,028.23		
Less proceeds from land sales	55,731.73	$4,683,296.50	
Expended since organization on new construction, additional equipment and permanent improvements, to October 31, 1906	$2,043,881.06		
For the year ending October 31, 1907	526,162.31	2,570,043.37	$7,253,339.87
Coosa Pipe & Foundry Company stock			10,000.00
Cash in hands of trustees for first consolidated mortgage			72.50
Inventories:			
Raw materials and furnace supplies	$100,346.39		
Materials in transit	8,596.50		
Pig iron	8,941.56		
	$117,884.45		
Commissary merchandise	78,862.94	$196,747.39	
Accounts receivable (net)		427,120.88	
Bills receivable	$38,851.64		
Less — bills discounted	38,431.64	420.00	
Cash on hand, in banks and in transit		108,872.14	733,160.41
Mine development expenditures and slope improvements		$59,781.11	
Discounts on bonds:			
Balance October 31, 1906 (adjusted)	$47,600.00		
Less—annual proportion written off	1,700.00	45,900.00	
Prepaid insurance		8,304.12	
			113,985.23
Total			$8,110,558.01

Liabilities.

Preferred stock issued		$1,250,000.00	
Common stock issued		2,500,000.00	$3,750,000.00
First mortgage extension and improvement 6% gold bonds, issued	$500,000.00		
Less—redeemed and cancelled	59,000.00	441,000.00	
First consolidated mortgage 5% 30-year gold bonds, issued			
Less—redeemed and cancelled		1,741,000.00	2,182,000.00
Bills payable		$129,812.25	
Accounts payable		419,064.64	
Employees' deposits and miscellaneous credits		12,782.14	
Bond interest, accrued		56,755.00	618,414.03
Depreciation, improvement and replacement, balance at Nov. 1, 1906	$244,152.17		
Add special appropriations from surplus	$175,392.55		
Provision out of Earnings for the year ending Oct. 31, 1907	150,000.00	325,392.55	
		$569,544.72	
Less expenditures to date previously charged to betterments and now written off	410,644.72	$158,900.00	
Blast furnace relining and miscellaneous operating		46,632.00	
Exhaustion of minerals and ore properties		211,270.99	416,802.99
Balance at October 31, 1906		$1,165,109.97	
Less special appropriation for depreciation, improvement and replacement fund (as above)	$175,392.55		
Other adjustments to write off extraordinary and operating expenditures previously carried in suspense	117,754.70	293,147.25	
		$871,962.72	
Net surplus earnings for the year, per income account		271,378.27	
			1,143,340.99
Total			$8,110,558.01

From President Joseph H. Hoadley's accompanying statement the following extracts are taken:

The past year has been very largely devoted to construction work with the usual difficulties attending construction and operation by the same forces at the same time, making it impossible to get the best results.

During the year we have expended on the property in this improvement and development work $561,763.74, in addition to the usual repairs which were made and charged directly into the cost of iron. In my opinion the property is to-day 100 per cent. better off as to efficiency than it was a year ago, and I believe that you can confidently look forward to getting back the money you have spent so liberally this year, in the ensuing years. Moreover, during the year we have completed the new furnace at Gadsden, upon which work had been progressing for 18 months. The company thus has four furnaces, all of them now in fine condition—one completely new, two thoroughly overhauled and practically as good as new, while the fourth, our smallest furnace, was in fair condition at the beginning of the year, and did not need much repair work.

It was deemed wise and in fact necessary to carry on considerable exploration work on the ore and coal properties. At Ironaton we have found a large quantity of brown ore not known before, which adds very greatly to the value of that property. At Gate City we put a diamond drill down 1200 ft., about one mile from the out-

crop, and found the ore in place, thus proving what was before only a surmise, as to the continuity of the red ore field of Birmingham, and giving us on that property a very great quantity of ore, making this one of the most valuable iron ore properties in the district. On the coal properties similar work has been in progress with equally satisfactory results.

OBITUARY.

EDWIN C. TERRY, Hartford, Conn., founder of the Terry Steam Turbine Company, died April 5, aged 58 years. He was a native of Terryville, Conn. He was graduated at the Sheffield Scientific School of Yale University in 1871, and became an expert in hydraulic and mechanical engineering. He was an inventor of note, among the mechanical ideas that he developed being the steam turbine which bears his name. He was best known perhaps for the strong influence he exerted in the original development of electrical power transmission, which he early put into practical use by taking the power generated at Farmington, Conn., to Hartford, organizing the Farmington River Power Company for the purpose. He was secretary of the company until his death. He was a member of the American Society of Civil Engineers. He leaves a widow and a son, James Terry, who is secretary and treasurer of the Terry Steam Turbine Company.

The Bituminous Coal Situation.

INDIANAPOLIS, IND., April 7, 1908.—(*By Telegraph*).—The first important official act of Thomas L. Lewis, who has succeeded John Mitchell as president of the United Mine Workers of America, was an effort to re-establish the joint interstate relations between operators and miners in the four chief competitive fields—Ohio, Indiana, Illinois and western Pennsylvania. On the first day of his term of office he sent telegrams to the chief representatives of both sides, asking if they would meet in Indianapolis, April 6, in an informal conference to discuss the revival of the interstate agreement. With reference to this action, he said it appeared to him that his first duty was to try to bring order out of chaos, caused by thousands of miners being out of employment as a result of the strike following the expiration of contracts with operators in the large producing fields.

When the conference met it was composed of representative operators of western Pennsylvania, Ohio, and Indiana. They have issued a call for delegates to a joint wage convention at Toledo, Ohio, beginning next Tuesday. It may result in the revival of the interstate agreement for the three States. Illinois operators were not represented, though the miners were. These operators are opposed to an interstate agreement this year, as they are now in conference with the miners of their State making a contract for the year. It is said that at the Toledo convention there will be no wage demands made by either side, but that the contest will be over working conditions at the mines.

The Western Iron & Supply Company, St. Louis, Mo., has changed its name to the W. G. Hagar Iron Company. The officers and management will remain the same as heretofore.

Thomas D. West, president of the American Anti-Accident Association, Sharpsville, Pa., has in preparation a pamphlet of some 70 pages to be entitled "Accidents—Their Causes and Remedies." It will be ready for distribution shortly, and will be for sale at a nominal price to assist in the work which is now being prosecuted by the organization in which Mr. West is the leading spirit. He writes that the country is waking up surprisingly on the subject of preventing accidents, almost every day bringing new developments encouraging him in his campaign against carelessness. He is now advocating the creation of local antiaccident boards under State authority with power to enter upon any premises to investigate complaints and follow up the remedying of conditions found to be conducive to accidents. He would have the local boards subject to State boards, with a national bureau for antiaccident work at Washington.

PERSONAL.

Charles E. Hyde, whose present address is New London, Conn., announces that he has resigned as president and general manager of the New London Marine Iron Works, and no longer has any connection with that company.

F. R. Chinnock will sever his connection with the B. F. Sturtevant Company on May 1. He has had charge of the electrical department of the company through its New York office. He is a pioneer in that line of business, having been associated for 18 years with the General Electric Company. It is his intention to enter the field of construction work, and his office will be located in the Taylor Building, 39 Cortlandt street, New York.

H. C. Holthoff, who has long been prominent in the mining machinery trade, has accepted an appointment from the Allis-Chalmers Company as manager of the new office which the company is establishing at Mexico City. Mr. Holthoff's office will be fully equipped to answer inquiries from prospective buyers of all classes and to furnish literature and quote prices on all lines of Allis-Chalmers machinery, including not only mining, crushing and cement making machinery, but also steam engines, steam turbines, gas engines, hydraulic turbines, electrical machinery, saw mill and flour mill equipments, pumps and pumping engines, transmitting machinery, air brakes, &c.

Alexander E. Brown, vice-president and general manager of the Brown Hoisting Machinery Company, Cleveland, who recently suffered a stroke of paralysis, is reported considerably improved, and his recovery is expected after a period of rest.

Wm. O. Vilter, secretary of the Vilter Mfg. Company, Milwaukee, Wis., has gone to Europe for a two months' business trip.

Charles H. Norton of the Norton Grinding Company, Worcester, Mass., has returned from a business trip to Europe.

J. D. Crosby, formerly superintendent of the Jersey City plant of the Crucible Steel Company of America, is now associated with the Henry Company, Providence, R. I., where he is organizing a department for flattening wire to be used in the construction of curtain rods.

The permanent address of Prof. H. M. Howe of Columbia University will hereafter be McLean Road, Bedford Station, New York.

Charles Greer, for some years assistant district manager of the tin plate plants of the American Sheet & Tin Plate Company in the New Castle and Sharon districts, has resigned, and will give his time to his personal interests. He is interested in a large cement plant soon to be erected in New Castle, Pa., and this will take much of his time.

Charles A. Clarke, head of the machinery house of Hill, Clarke & Co., Inc., will sail from New York for Europe April 16. It will be a business trip, covering England, France, Holland, Germany and possibly Russia and Sweden.

E. H. Webster, who has had several years' experience in the mechanical line, and has a large acquaintance, has accepted a position with the American Steam Gauge & Valve Mfg. Company, and will make his headquarters at its Chicago office.

William H. Donner has been elected vice-president of the Westinghouse Machine Company, Pittsburgh, which was taken out of receivers' hands a few days ago. It is understood that he is the choice of the large creditors. President George Westinghouse has issued a circular making the announcement of Mr. Donner's election, and stating that the latter will have direct responsible charge of all the company's activities. Mr. Donner's brilliant history in connection with the tin plate trade and the Union Steel Company is so well known that it is unnecessary to refer to it in detail.

The Aluminum Situation.

A fairly well defined sentiment exists in the metal trade that with the expiration of the Hall patents this year considerably lower prices may be named on aluminum. While at one time these patents were undoubtedly the backbone of the industry, it must be observed that the Bradley patents are also valuable and will not expire for two years. All these patents are controlled by the Aluminum Company of America.

In the latter part of 1906 and early in 1907, in connection with the rapidly advancing market for copper, aluminum was almost unobtainable and at one time the company above named had its wire drawing capacity contracted for several months in advance. With the diminishing demand for copper the demand for aluminum also fell off, although not in the same proportion as copper, because its price had not been forced to such an unreasonable hight as that of copper. Notwithstanding this, the price gradually declined through 1907, and late in the year the general quotation of the principal producer was 33 cents for No. 1 ingots in ton lots. Since then there has apparently been a greater disposition on the part of foreign producers to sell in this country. Although it is not positively known that there has been an international agreement by which European producers would not sell in this country, and the United States producer would not invade European territory, there has been a pretty definite opinion that this was the case. Statistics of imports and exports bear out this view. Recently, however, aluminum has been offered from abroad with more or less freedom at prices approximately the same as those of the American producer, despite a duty of 8 cents per pound on ingots. This may, however, be remelted scrap or American metal for resale.

American Production a Monopoly.

The production of aluminum in this country is practically a monopoly, and the Aluminum Company of America has taken steps to intrench its position by securing favorable water power and building large and economical plants. In fact, it is believed to have nearly doubled its producing capacity in the last two years. In addition to the ownership of essential patents, the known domestic deposits of bauxite are controlled by this company.

The various uses of aluminum have been along lines considerably different from those generally credited to it. Steel manufacturers are quite extensive consumers, using it as a deoxidizer in their converting departments. A large manufacturer of structural shapes and plates is said to take not less than 50 tons per month for this purpose. Where weight is a factor in the construction of machinery, such as automobiles and motor boats, aluminum in the form of an alloy is largely used. The difficulty of soldering aluminum sheets has heretofore prevented its general adoption for a wide range of usage, but with more general experimenting it is reasonable to suppose that some better method of fastening pieces together than riveting will be found. Although its electrical conductivity is high it has not yet been extensively used as a substitute for copper in that field. One reason, perhaps, is that there has not been enough inducement in cost. In California, however, it has been used more than in any other section, largely because of climatic conditions and of the long distance lines, one being 180 miles long. This use as well as the use in alloys may reasonably be expected to increase.

Prices Have Steadily Been Reduced.

The price of aluminum has shown almost a continuous downward trend. When first made, the price was practically prohibitive, the metal being regarded more or less as a curiosity. In 1884 the price was $12 a pound. A decade later it had been reduced to 50 cents, and another decade brought it to 33 cents. With the worldwide advance in the price of copper and the general inflation in metals in 1906 a temporary advance to around 40 cents was made, but within the last few months the price has receded to the quotation of 33 cents by the American producer, while in Europe aluminum over 99 per cent. pure can be had at lower figures. Foreign manufacturers are now stated to be willing to accept large orders for American delivery on a basis of 30 cents a pound, absorbing the duty of 8 cents per pound. In some quarters a more open market is expected after the basic patents expire. New productive capacity may not then be available for some time, however, as the farsighted policy of the principal producer may deter large interests from competing.

Had the extravagant claims of many of the early users of aluminum been realized, production must certainly have increased at a far more rapid rate than it has done to keep up with the demand. Production, nevertheless, has increased by leaps and bounds. While American producers made about 1800 tons in 1901, and the whole world approximately 3400 tons, this was doubled in 1902, when the American production increased to 3300 tons and the world's output to 7800 tons. By 1907 the production had again doubled. While the output of that year has not been accurately figured, 6000 tons was made in the United States in 1906 and the world's production was 14,500 tons.

The Status of Four Leading Railroad Projects.

Information has been gathered recently by the *Railroad Gazette* concerning the status of the various railroad construction projects now in hand in the United States. While nothing of large importance has been started in a good many months, there are several noteworthy undertakings by strong companies on which further work will be done in 1908. It is found that present costs of labor and materials are about 30 per cent. less than those of 1905 and 1906, when these large pieces of construction were begun. The four leading operations are the extension of the Chicago, Milwaukee & St. Paul to the Pacific Coast, the Western Pacific, the Denver Northwestern & Pacific and the Spokane, Portland & Seattle. The following details are given as to the status of each:

Chicago, Milwaukee & St. Paul.—Extension from Glenham, S. D., west via Butte, Mont., to Seattle, Wash., 1372 miles, with a branch from Black River Junction south to Tacoma, 20 miles. There will be seven steel bridges aggregating 5725 ft., with steel approaches 3425 ft. long; 1500 ft. of steel trestles; four tunnels with a total length of 15,630 ft., and later at Snoqualmie Pass a tunnel about 2 miles long. All steel bridges and trestles will be erected by the company's men. Track laid on January 1 from Glenham west to Ives, N. D., 183 miles, and on 144 miles in Montana, out of 731 to finish the line to Butte. It is expected that construction will be completed to Butte by May and to the coast by the end of 1908, except for the Bitter Root Tunnel in Montana.

Western Pacific.—Building from Salt Lake City, Utah, west to Oakland, Cal., 929 miles, of which 122 miles are in Utah, 427 in Nevada and 380 in California. Up to February 20, 1908, grading finished on 620 miles and track laid on 275 miles, including the section from Salt Lake City west to the crossing of the Nevada Northern at Shafter, Nev., and in California from Stockton east 35 miles, and from Marysville east 34 miles. There will be 43 tunnels aggregating 45,342 lineal ft., three of which are to be over a mile long and a fourth over 4287 ft. Tunnel work about 55 per cent. finished. There are to be 75 steel bridges, a total of 15,535 ft. long; seven of these have been finished.

Denver Northwestern & Pacific.—Contract let to extend this line from Yarmony, Colo., west to Steamboat Springs., 68 miles. The line is being built from Denver, Colo., west to Salt Lake City, Utah, 490 miles. In operation from Denver to Yarmony, 147 miles, leaving 343 miles to finish the line to Salt Lake City.

Spokane, Portland & Seattle.—This road, formerly the Portland & Seattle, is a joint project of the Northern Pacific and Great Northern, to give them a direct low grade line to Portland, Ore. Building from Portland up the north bank of Columbia River and to Spokane, Wash., with branch east along the Snake River to Texas Ferry, Wash., a total of 415 miles. From Vancouver, Wash., to Kennewick, opposite Pasco, 220 miles, finished in 1907. Work under way on double-track steel bridges over the Columbia and Willamette rivers. The line between Pasco and Spokane, 145 miles, and the branch to Texas Ferry, 41 miles, also the 10 miles from Vancouver south to Portland is expected to be finished by August.

Members of the Molders' Union at Youngstown, Ohio, are stated to have prepared a bill to provide for State inspection of all establishments where metal castings are made. The bill is to be introduced in the present session of the State Legislature, and its ostensible purpose is to reduce danger of accidents to men who are employed in foundries. An effort is being made to have the bill indorsed by molders throughout the State.

How Pittsburgh Treats Railroads.*

BY ROBERT MATHER, PRESIDENT ROCK ISLAND COMPANY.

It is not because of the extent of Pittsburgh's commerce, vast as it is, nor because of its historic associations, absorbing as they are, that a discussion here of the subject of railroad regulation peculiarly appeals to me. It is rather because here, where a greater tonnage moves than anywhere else in the country, there is less of controversy between shipper and carrier than anywhere else in the land.

Pittsburgh Makes No Complaint About Railroad Treatment.

I am told that here in the country's nerve center of traffic, out of all the multiplied millions of transactions between merchants and railroads, there has never been found a cause of complaint to present to the Interstate Commerce Commission. This does not mean that the railroads have never been wrong or unreasonable or exacting or inefficient, or that the shipper has never demanded what he ought not to have received. I have no doubt that in the weakness of human nature many of these things, on both sides, have occurred. But there has been found a way in Pittsburgh to move an unparalleled tonnage in spite of all such discouragements and conflicts with satisfaction to both shipper and carrier, without the intervention of courts or commissions. I hold that fact to be of great significance in these days of clamor for increased regulation of the business of transportation, and I deem it worthy of our serious thought.

I appreciate fully that, in this respect, no miracle has been wrought in Pittsburgh. I yield to you gentlemen of the Traffic Club high praise for the achievement I am extolling, but I still believe you to be an ordinary lot of men uninspired, except by the spirit of good sense. I understand that you proceed upon the very human and rational theory that the interests of producer, transporter and consumer are alike and mutually dependent; that without production there can be no transportation, and that unless the combined efforts of producer and transporter can lay down your product before the consumer upon a basis that the consumer can afford your commercial activities are doomed to failure.

Go Directly to the Railroads for Relief.

So when you find that a consumer or a community that in view of all other commercial conditions ought to be taking your product is not taking it, you look for the cause in the rates or practices of the railroad that carries your product to that place. If you find that a change in rates will secure the customer or the community, or that an improvement in train service, or some addition to the carrier's facilities will move the traffic, instead of filing a complaint at Washington, you go to the railroads directly and ask them to help you, and at the same time to help themselves, by making the change that will produce the result. And so willingly have the railroads met and co-operated with you that, in the working out of the myriads of such problems that your teeming commerce has presented, you have not yet been denied a request the denial of which could give you ground for legal complaint.

I believe that this Pittsburgh plan of conference and co-operation between railroads and shippers should be given wider scope before we become finally wedded to the alternative plan of governmental compulsion. What you have done in conducting your manifold and stupendous dealings with the railroads, not only without clamor for additional restrictive laws against them, but without even invoking such laws as exist, can and ought to be done elsewhere.

A Suggestion That Might Help Settle Knotty Questions.

More than this, not only the carrier and the shipper, but the representatives of the regulating power of the Government should meet on this platform of mutual confidence and co-operation. It is perfectly feasible in every commercial center like Pittsburgh for the railroad traffic associations to hold open meetings with the representatives of the shippers, to make up their docket of subjects to be acted upon not only from the requests of their members, but from the suggestions of their customers, and to place the docket in the hands of all entitled to attend a reasonable time in advance of the meeting.

It is further not only practical, but in my judgment highly desirable that a member or a representative of the Interstate Commerce Commission should not only attend those meetings, but even preside over their deliberations and umpire their disputes, with possibly some provision for appeal to the Commission itself. Thus would we revert to the example of Washington when he and the Colonial commissioners met in peace and not in strife to solve by mutual helpfulness the national problem of transportation.

* Extract from an address before the Traffic Club, Pittsburgh, April 3.

The Treatment of Chilling Iron with Nickel.

R. C. Totten, Pittsburgh, Pa., has been granted a patent on a new composition of casting metal comprising chilling cast iron and nickel. In order to chill the cast iron must contain 0.5 per cent. of combined carbon. The invention is based on the affinity of nickel for the combined carbon, and on the fact that by varying the proportion of nickel to combined carbon the depth of chill may be regulated. The inventor says that the amount of nickel alloyed with the iron is made to follow approximately the proportion of combined carbon in the iron. If there is 1 per cent. of combined carbon in the chilling iron, 1 per cent. of nickel may be used. But by varying the proportion of nickel the depth of the chill may be varied, since the nickel has a tendency to reduce the chilling properties of the combined carbon. For instance, if a chilling iron containing a certain percentage of combined carbon has added thereto, say, 1½ per cent. nickel and produces a casting having a chill 1 in. thick, then by using exactly the same iron and increasing the percentage of nickel the depth of the chill will be decreased, or, by decreasing the quantity of nickel, the depth of the chill will be increased. This possibility of regulating the depth of the chill by varying the quantity of nickel used is of special importance in the utilization of scrap from car wheels, chilled rolls, &c. If such scrap is remelted and recast there is a large increase in the proportion of combined carbon, giving an abnormally deep chill and rendering the article very brittle. By the use of nickel a chill of the desired depth is obtained and the strength and ductility of the nickel are greatly increased.

The buildings and site of the Western Malleable & Grey Iron Mfg. Company, Milwaukee, Wis., have been sold to Thomas J. Neacy, president of the Filer & Stowell Mfg. Company. The plant is located on Chase street and occupies a two-acre tract of land, with 700 ft. of railroad frontage. Mr. Neacy says the purchase was made in the interest of the Milwaukee Valve Company, owned by him, and which has heretofore occupied leased quarters. The plant will be moved to the property just purchased and the Western Malleable & Grey Iron Mfg. Company will move its business back to Port Washington, Wis., where it was originally conducted.

The report that the Seattle Electric Company, Seattle, Wash., is contemplating the expenditure of $1,500,000 for extensions and new equipment at its Georgetown power plant is erroneous. While plans are not fully developed for the year, they will include no additions to the power plant. The Pacific Coast Power Company, an allied company, will soon begin work on the development of a large water power plant on the White River, which will have an ultimate capacity on minimum flow of 50,000 hp.

The Niagara Forged Steel Company, Buffalo, N. Y., manufacturer of track equipment and railroad and general forgings, has appointed the W. R. Beatty Machinery & Equipment Company, 613 House Building, Pittsburgh, its agent for western Pennsylvania, eastern Ohio, and West Virginia.

More Pig Iron in March.

February Daily Rate Exceeded.

Active Capacity Falls Off at the Close of the Month.

Returns from the blast furnace companies show that in March production of coke and anthracite pig iron increased. The total for the month was 1,228,204 gross tons, or at a daily rate of 39,619 tons, as compared with a total of 1,077,740 tons and a daily rate of 37,163 tons in February. However, through the blowing out of a number of furnaces in the last week in March, notably four Edgar Thomson stacks and two at Ensley, the weekly capacity active April 1, namely 265,590 tons, shows a falling off from the capacity active March 1. Twelve furnaces blew in last month and 11 blew out. Below is given a statement of the daily output of steel works and merchant furnaces in the past three months, showing that the latter have made some increase in the past month:

Daily Rate of Production of Steel Works and Merchant Furnaces.—Gross Tons.

	Steel works.	Merchant.	Total.
January	21,432	12,286	33,718
February	25,717	11,446	37,163
March	27,145	12,474	39,619

The table below gives the production of coke and anthracite furnaces in March and the four months preceding:

Monthly Pig Iron Production—Gross Tons.

	Nov. (30 days)	Dec. (31 days)	Jan. (31 days)	Feb. (29 days)	March. (31 days)
New York	111,407	86,993	82,962	65,567	49,231
New Jersey	24,079	22,555	22,447	19,880	23,243
Lehigh Valley	61,969	54,881	47,538	39,732	39,105
Schuylkill Val.	43,876	37,747	24,002	22,338	29,104
Lower Susquehanna and Lebanon Val.	47,683	31,090	20,323	19,363	23,907
Pittsburgh Dis.	409,024	258,412	304,521	324,418	325,953
Shenango Val.	124,159	76,086	69,149	68,919	76,377
West. Penn	130,192	105,671	60,355	51,283	62,782
Md., Va., and Kentucky	79,293	61,433	30,621	27,775	41,452
Wheeling Dis.	76,014	12,051	0	12,961	18,988
Mahoning Val.	129,334	68,776	64,437	93,332	105,310
Central and North. Ohio.	149,362	84,087	52,297	75,137	94,952
Hocking Valley and Hanging Rock	28,017	15,658	8,404	12,296	20,108
Mich.,Minn.,Mo., Wis., Colo	59,697	48,950	38,172	36,129	39,327
Chicago Dis.	200,309	148,691	120,874	99,289	147,014
Alabama	118,190	94,810	81,541	91,209	114,295
Tennessee, Georgia and Texas	35,520	26,388	17,607	18,112	17,056
Totals	1,828,125	1,234,279	1,045,250	1,077,740	1,228,204

Production of Steel Companies.

Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Youngstown Sheet & Tube Company, Jones & Laughlin, La Belle, Bethlehem, Calumet, Inland, Colorado and Tennessee (Ensley) companies show the following totals of product month by month. We give separately a statement of the output of spiegeleisen and ferromanganese, which is included for each month in the total production:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1906.	1907.	1908.	1907.	1908.
January	1,358,015	1,406,397	664,415	21,477	20,254
February	1,226,760	1,317,923	745,802	19,444	9,402
March	1,400,395	1,424,827	841,502	31,091	13,750
April	1,333,591	1,446,788	.....	26,527	.....
May	1,372,423	1,470,080	.....	28,822	.....
June	1,293,437	1,457,230	.....	30,942	.....
July	1,323,391	1,452,557	.....	25,343	.....
August	1,237,485	1,445,685	.....	23,696	.....
September	1,264,380	1,417,153	.....	30,270	.....
October	1,452,200	1,514,521	.....	35,105	.....
November	1,411,350	1,084,114	.....	21,861	.....
December	1,445,528	659,459	.....	19,480	.....

Capacity Active April 1 and March 1.

The following tables give the weekly capacity of coke and anthracite furnaces in blast April 1 and March 1:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	April 1. Number in blast.	April 1. Capacity per week.	March 1. Number in blast.	March 1. Capacity per week.
New York:					
Buffalo	14	6	11,298	5	9,785
Other New York	10	2	2,751	2	2,920
New Jersey	8	4	5,245	4	4,798
Spiegel	2	0	0	0	0
Pennsylvania:					
Lehigh Valley	25	8	8,232	9	9,220
Spiegel	3	1	142	1	145
Schuylkill Valley	14	5	6,041	4	4,692
Spiegel	1	1	755	1	702
Low. Susquehanna	7	2	2,854	1	2,010
Spiegel	1	0	0	0	0
Lebanon Valley	10	3	2,584	3	2,659
Pittsburgh Dist.	45	21	58,491	27	75,047
Spiegel	3	2	1,274	1	624
Shenango Valley	20	8	18,062	7	18,344
West. Penn.	27	9	14,175	9	15,680
Maryland	4	2	3,616	1	1,931
Wheeling Dist.	14	2	4,287	2	3,850
Ohio:					
Mahoning Valley	18	10	23,258	10	23,996
Central and North. and Michigan	22	8	22,456	8	18,787
Hocking Valley and Hanging Rock	12	6	4,542	6	4,620
Illinois and Indiana	23	13	33,082	12	27,003
Spiegel	2	1	903	0	0
Minnesota	1	0	0	0	0
Wisconsin	6	2	2,611	2	2,425
Missouri	1	0	0	0	0
Colorado	6	3	6,093	3	5,831
The South:					
Virginia	23	8	6,023	7	4,885
Kentucky	7	1	1,155	1	710
Alabama	46	16	21,340	18	23,175
Tennessee	18	7	4,320	6	3,598
Georgia and Texas.	3	0	0	0	0
Totals	396	151	265,590	150	267,437

A Record of Active Capacity.

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1903:

	Capacity per week.		Capacity per week.
April 1	265,590	August 1	410,088
March 1	267,437	July 1	408,617
February 1	241,925	June 1	443,092
January 1, 1908	232,652	May 1	452,031
December 1, 1907	347,372	April 1	439,564
November 1	491,436	March 1	403,157
October 1	511,397	February 1	405,702
September 1	507,768	January 1, 1905	377,879
August 1	513,471	December 1, 1904	357,846
July 1	528,170	November 1	334,249
June 1	523,220	October 1	319,249
May 1	524,538	September 1	291,573
April 1	496,456	August 1	246,092
March 1	511,035	July 1	272,301
February 1	492,359	June 1	336,107
January 1, 1907	507,397	May 1	368,244
December 1, 1906	513,860	April 1	337,257
November 1	500,580	March 1	308,751
October 1	469,665	February 1	273,692
September 1	441,426	January 1, 1904	185,636
August 1	449,908	December 1, 1903	244,156
July 1	460,570	November 1	273,715
June 1	472,622	October 1	353,142
May 1	484,031	September 1	360,197
April 1	484,240	August 1	353,681
March 1	479,737	July 1	384,825
February 1	482,156	June 1	388,178
January 1, 1906	463,673	May 1	373,496
December 1, 1905	475,814	April 1	386,215
November 1	460,449	March 1	347,424
October 1	445,468	February 1	335,239
September 1	412,563	January 1, 1903	346,073

Furnaces Blown In or Blown Out.

The list of furnaces blown in in March includes one Lackawanna at Buffalo, Keystone and one Warwick in the Schuylkill Valley, Clinton in the Pittsburgh District, Hall in the Shenango Valley, one Paxton at Harrisburg, Victoria in Virginia, one Sparrows Point in Maryland, Dover in Ohio, two South Chicago in Illinois and Embree in Tennessee.

Among furnaces blown out last month or banked in the month and remaining so on April 1 were the Detroit Furnace Company's stack in Michigan, one Brooke in the Schuylkill Valley, one Crane in the Lehigh Valley, four Edgar Thomson and two Carrie in the Pittsburgh District and two Ensley in Alabama.

NEWS OF THE WORKS.

Iron and Steel.

No. 2 furnace of the Central Iron & Steel Company, Harrisburg, Pa., was put in blast March 10.

Dover Furnace of the Penn Iron & Coal Company, Canal Dover, Ohio, was blown in March 16.

The No. 7 furnace at the South Works of the Illinois Steel Company was blown in March 1 and the No. 5 furnace of the same group went in March 15.

Vanderbilt Furnace of the Birmingham Coal & Iron Company, Boyles, Ala., made a record product in March, with a total of 4219 tons.

No. 1 furnace of the Alabama Consolidated Coal & Iron Company at Gadsden, Ala., was blown in at the beginning of the present week.

The furnace of the Embree Iron Company, Embreeville, Tenn., was blown in March 23, after a shutdown of 90 days.

The No. 3 stack of the E. & G. Brooke Iron Company, Birdsboro, Pa., which had been active since November 15, 1907, was blown out March 25. The other stack of this company has been idle since December 31.

One of the Crane stacks of the Empire Steel & Iron Company, Catasauqua, Pa., was blown out March 31, leaving one stack active.

The new No. 1 furnace of the Shenango Furnace Company, Sharpsville, Pa., is not yet ready for operation. The No. 3 furnace of this group is the only one now active. It was started up March 16.

The proceeds from the $5,000,000 bond issue recently voted by the Alabama Consolidated Coal & Iron Company, Birmingham, Ala., will be largely utilized in making extensions to the plant. The company spent $600,000 last year rebuilding its furnaces at Ironaton, completing its new furnace at Gadsden, rebuilding the short line of railroad to its Lewisburg mines and in installing new machinery in several of its collieries.

The Chesapeake Nail Works, Harrisburg, Pa., is running all its departments, having started in full last week after a period of partial operation.

The Pennsylvania Steel Company is relining its No. 3 furnace at Lebanon, Pa. The company's No. 3 furnace at Steelton, which was recently improved, is making a record, having recently produced 435 tons in a single day.

On April 1 three of the 11 Edgar Thomson furnaces of the Carnegie Steel Company at Bessemer, Pa., were in blast and eight idle. Furnace J was blown out March 24, G March 27, K March 28 and I March 29. No. 5 Carrie stack at Rankin was blown out March 29.

Clinton Furnace of the Clinton Iron & Steel Company at Pittsburgh has blown in on foundry iron.

The Lackawanna Steel Company, Buffalo, N. Y., reopened its rail mill No. 1, the largest of the plant, on April 6, giving employment to about 2000 men in the mill and other departments that will resume operations incidental to the reopening of the rail mill, and bringing the total present working force up to 4500 men. The resumption of work in the rail mill, which has been shut down since December, is due to the receipt of the New York Central Railroad Company's order for 24,000 tons of steel rails, one of smaller tonnage from a Pennsylvania railroad and various small orders from different sections of the country, assuring sufficient business to keep the mill in operation for some time to come. The structural and slab mills have been running for some time.

The No. 7 furnace of the Lackawanna Steel Company, Buffalo, N. Y., which was banked February 29, started again March 30. The No. 1 furnace, which has also been banked for some weeks, went in blast this week.

Two furnaces at the Tennessee Coal, Iron & Railroad Company's Ensley, Ala., plant, have been blown out for repairs.

The plant of the Birmingham Foundry & Machine Company, Birmingham, Ala., has been put in operation after a suspension for some months.

General Machinery.

The Luitwieler Pumping Engine Company, Los Angeles, Cal., is considering a proposition from the city of Santa Monica, Cal., for the removal of its plant to that place, and the prospects for a favorable termination of the negotiations now pending are said to be good. Under the plan covering the proposed change new and larger shops will be erected and the manufacturing facilities of the company largely increased. A recent addition to its line of pumps and pumping machinery is a self-propelling fire engine, which it is now making.

The plant, equipment and property of the Southern Foundry & Machine Works, Fredericksburg, Va., will be sold at public auction April 20.

The Empire Lime & Stone Company, Moundsville, W. Va., intends to purchase crushing machinery for a large crushing plant it is to install. An extensive lime plant will also be erected.

The Hemsley Patent Adjustable Top & Tire Bolting Machine Company, Trenton, N. J., will erect a plant to manufacture the Hemsley tire bolting machine, the invention of Joseph Hemsley. The machine is simple in construction and is used to screw and unscrew tire bolt nuts.

The Thornton Machinery Company, Providence, R. I., dealer in machinery and supplies, has gone into bankruptcy.

Power Plant Equipment.

Bids will be received for construction of a two-story power house for the city of Juneau, Wis., until April 18. W. G. Kirchoffer is consulting engineer, Madison, Wis.

The Atchison Railway, Light & Power Company, Atchison, Kan., which has been reported as contemplating the reconstruction of its plant, states that this work will not be undertaken during the present year. Some new machinery will, however, be installed this season, but the extent of these purchases has not been fully determined.

The Columbus Light, Heat & Power Company, Columbus, Neb., has been incorporated, with a capital of $150,000, by William C. Ross, John L. Burke and John W. Parish.

The capital stock of the Knoxville Power Company, Knoxville, Tenn., has been increased from $100,000 to $150,000. The chief engineer of the company is John Bogart, New York.

The Memphis Ice & Electric Company, Memphis, Texas, is preparing to enlarge its electric light plant, for which machinery has already been ordered. The new installation will probably be in operation by June 1.

The town of Lynden, Wash., is contemplating the installation of a water works system, comprising a steam pumping plant, a 50,000-gal. tank on a 60-ft. tower, and about 10 miles of 6-in. and 4-in. mains. Plans for this installation have been prepared by Fuller & Manley, Tacoma, Wash.

The Falls Light & Power Company, Sheboygan Falls, Wis., has been incorporated, with a capital stock of $25,000. The officers are O. B. Weisse, president, and John Van Onwerpeck, secretary and treasurer.

The E. G. Whitacre Boiler Company, Wellsville, Ohio, has been reorganized by the election of the following officers: I. N. DeNoon, president, Pittsburgh; C. V. Shoub, vice-president, Wellsville, Ohio; W. C. Dellamyer, secretary and treasurer, Wellsville. The present name of the company will be retained, and it is the intention in the near future to increase the output of hot water and steam boilers, radiators and heating supplies.

Thomas C. Beggs and W. H. Johnson, Terre Haute, Ind., have bought a site at Brazil, Ind., for an artificial ice and cold storage plant, estimated to cost $80,000.

Foundries.

The Hardwick Foundry & Machine Company, Dallas, Texas, has increased its capital stock from $50,000 to $80,000.

The Yakima Iron Works, having demonstrated that in central Washington there is a large field for its operations, has completed plans for a foundry, in addition to its present machine shop, at North Yakima, Wash. With the foundry and new machinery ordered the investment in this plant will aggregate $20,000.

The A. W. Findlay Company, Inc., Philadelphia, Pa., has recently booked a number of orders for lamp posts, while a number of proposals for work of this class are still being estimated on. Business in this branch of its foundry trade has been better during the last three months than for any like period for a number of years, municipalities in both the East and West having considerable work of this character under way. One of the recent orders taken was for 125 ornamental electric lamp posts for Seattle, Wash. These are of special design and very massive in appearance. A duplicate order is expected to be received for the same quantity in the near future.

The Lackawanna Steel Foundries, recently incorporated, has purchased the plant recently erected by the Sims-Kent Company on Salem street, Dover, N. J., which it will place in operation within a few days, manufacturing gray iron, brass and bronze castings. The new company, whose New York office is at 74 Broadway, begins business with the assurance of many orders, and expects to make improvements to the plant as soon as business shall warrant. George Pierson is president;; Henry E. Dixey, vice-president; L. C. Hillard, second vice-president and sales manager; J. H. Haributt, treasurer; J. D. Brooks, secretary, and James W. Kent, manager. These officers and Haverley Brooks Swart constitute the Board of Directors.

Bridges and Buildings.

The Dravo Construction Company, Lewis Building, Pittsburgh, Pa., has received the contract for the masonry work to support the new two-track bridge at Beaver, Pa., to be erected by the Pittsburgh & Lake Erie Railroad. It is expected that bids for the structural steel for this bridge, 12,000 to 14,000 tons, will be asked for in a short time.

Fires.

The rolling department of the Milton Mfg. Company, Milton, Pa., was damaged $50,000 by fire March 30.

The plant of the Hygeia Ice Company, Englewood, N. J., was burned April 2, the loss being about $25,000.

A. M. Danbury's foundry and machine shop at Ripley, Ohio, were burned April 1, with a loss of $10,000.

The pattern shop of the American Steel Foundry Company, Pittsburgh, Pa., was damaged $5000 by fire March 30.

Hardware.

The Delaware Marine Supply Mfg. Company, Wilmington, Del., manufacturer of marine hardware, car trimmings, ship fittings, port lights, hinges, hex nuts, ferrules, &c., states that the past winter season has been a very busy one. Among other contracts were complete outfits for 17 vessels, including about 3000 ft. of overhead parcel racks of the style used in Pullman cars, air ports and other fittings.

Miscellaneous.

The capital stock of the Trussed Concrete Steel Company, Detroit, Mich., has been increased from $1,000,000 to $1,200,000.

The A. D. Baker Company, Swanton, Ohio, builder of traction engines and separators, is finding that last fall's campaign of demonstration at the county fairs and meetings in agricultural districts has begun to bear fruit and some very good business is coming in.

The Forged Steel Wheel Company, Pittsburgh, Pa., has increased its capital stock to $1,750,000.

Coincident with a change of management that has recently taken place in the Atlantic Gas & Fuel Company, Atlantic, Iowa, it has been decided to make extensive improvements in the plant, which will include numerous extensions of mains and the installation of equipment, but the company does not, as has been reported, intend to enter the electric lighting field.

The Cooper Oven Thermometer Company, Terryville, Conn., has been incorporated under Connecticut laws to carry on the business founded by the late David G. Cooper. The Connecticut Trust & Safe Deposit Company, Hartford, as administrator of the estate, is the organizer of the company, as directed by the will of Mr. Cooper, and will have general oversight of the business for the present, though Albert E. Whittier, a practical manufacturer and inventor, who has been manager of the business for several years, will continue in the same capacity. The company will manufacture but the one article, the oven thermometer, carrying out the general policy laid down by the founder of the business.

The San Francisco Citizens' Health Committee has received a report from the special committee appointed to inquire into the subject of incinerating plant. Four such plants are recommended.

Tate, Jones & Co., Inc., Empire Building, Pittsburgh, works at Leetsdale, Pa., manufacturer of Kirkwood oil burners and oil furnaces, has received a contract from the A. Leschen & Sons Rope Company, St. Louis, for a complete outfit of three oil furnaces, with pumping apparatus, &c.

Plans for the construction of a mechanical filtration plant for Evansville, Ind., have been completed by F. W. Witherell, Pittsburgh, Pa., and have been submitted to the trustees of the water works of Evansville.

The Susquehanna Smelting Company, Philadelphia, Pa., has secured the buildings at Lockport, N. Y., formerly occupied as the molding shops of the Holley Mfg. Company, and will improve and equip them for the smelting of copper. A contract has been closed with the Lockport Light, Heat & Power Company for 1000 hp., to be delivered by the Niagara Falls transmission line, for the operation of the plant.

I. A. Aldrich, proprietor of the Aldrich Mfg. Company, Buffalo, N. Y., manufacturer of copper and brass goods, has purchased the old plant of the Kellogg Iron Works, at Illinois and Mary streets, now occupied by the Day Foundry Company, and will erect a six-story factory building of reinforced concrete on the site. The new building will be equipped for operating in connection with the company's present plant on the opposite side of Illinois street.

The St. Clair Air Brake Company has been organized at Indianapolis, Ind., by E. F. Claypool, Henry Schurmann, W. C. Shoemaker, Augustus St. Clair, Robert Stimson, Newton Claypool, F. R. Judson, J. R. Francis and Henry Wetzel. The brake to be manufactured differs from those now in general use in that the air pressure holds the brake open and applies it when the air is released, the reverse of the present system in common use, although it is interchangeable with that system.

The International Iron Works, Seattle, Wash., has been incorporated, with a capital stock of $100,000, by F. E. Hawksworth, A. J. Henry and C. J. Young.

The Railroad & Car Material Company has recently been incorporated and has opened offices in the Bessemer Building, Pittsburgh, Pa. The company will handle railroad equipment and supplies, and will also deal in wholesale lumber. J. W. Scull, formerly purchasing agent of the Pressed Steel Car Company, is president; C. W. Cantrell, formerly Eastern sales manager of the Herman H. Hettler Lumber Company, Chicago, vice-president, and W. H. Coyle, identified with real estate interests in Pittsburgh, secretary.

The Daisy Automatic Dryer Company, 253 Grant street, Pittsburgh, Pa., is arranging to incorporate and to build a plant for the manufacture of the Daisy gravity feed sand and mineral dryer. The machine is a new invention, and those which were built for demonstrating are said to have proved very successful on trial.

The New Pig Iron Contract.

As a result of the meeting held at Dayton, Ohio, April 2, by the Iron Buyers' Association, a new contract for the purchase of pig iron will be presented for transactions between the users and manufacturers of iron in Cincinnati territory. Vice-President G. H. Gorman of the Davis Sewing Machine Company presided at the meeting, which was well attended. The proposed uniform contract was unanimously adopted, with two slight changes from the original draft printed in *The Iron Age* of January 30.

The item "Grade, clause B," now reads: "By analysis as specified." The definite stating of each of the elements in the contract seemed to be a source of misunderstanding on the part of the furnacemen, who thought that because all the elements were given in the contract they would be required to furnish iron analyzing all of these elements. This, according to an official of the association, was not the original intention. To the clause referring to disputed weights is added: "Cost of reweighing to be charged to the party in error."

S. M. Blackburn of the John B. Morris Foundry Company, Cincinnati, chairman of the Contract Committee, was heartily congratulated for his earnest and painstaking work in the interests of the new form. He also explained the method of buying pig iron warrants, which came up for general discussion.

The report of the Traffic Committee, of which Commissioner E. E. Williamson of the Receivers' & Shippers' Association of Cincinnati is chairman, was read and accepted. It was felt that the preliminary work in the interests of a lower freight rate from the Birmingham District has been well done, and that the outlook is hopeful.

The resignation of President Wm. Fetzer was an incident of the meeting. Other important incidents were the words of cheer and promises of co-operation from the Central Association of Stove Manufacturers and the Southwestern Foundrymen. The "Revised Sales Contract," as the new form will be known, is now in the hands of the printer. As soon as finished Secretary Wm. Gugenheim, Springfield, Ohio, will mail them to all members of the association and buyers of pig iron in the Cincinnati District.

The Andrews Steel Plant Started.

The Andrews Steel Company started its new plant in Newport, Ky., on Saturday, April 4. In *The Iron Age* of February 20 a description was given of this plant, which consists of open hearth furnaces, blooming mill and sheet bar mill. The first heat of steel was poured at 6.42 a.m., 8 hr. and 42 min. after the commencement of the charging of furnaces. The blooming mill rolled the first ingot at 9.12 a.m. Each ingot was successfully rolled into billets without loss of a single one and without a cobble. The company regards this achievement with considerable satisfaction inasmuch as similar experiments have seldom resulted in the making of good steel and rolling them into billets without cobbles or other losses on the first trial. The mill is now being operated continuously, running mainly on orders for sheet bars from the Newport Rolling Mill Company. After filling a large order for this source, which is expected to take two weeks, the Andrews Steel Company will probably have part of its product to dispose of in the open market.

Russia plans to build four battleships having a displacement of 21,000 tons each and a speed of 21¼ knots. Two are to be completed in three years and two in four years.

The Iron and Metal Trades

The feeling among manufacturers of Iron and Steel is that prices should be maintained, although it is admitted that this is likely to be more difficult during the next few months than during the period after the panic, because merchants and consumers have now worked off stocks purchased at old prices, for which they claimed and got protection. It is understood that if a lowering of prices should become desirable—a contingency which the manufacturers admit—then no action will be taken by the leading interests without prior consultation. In other words, the Iron and Steel trade is committed to an orderly adjustment of values.

The statistics of coke and anthracite Pig Iron collected by *The Iron Age* show that the output in March was 1,228,204 gross tons, as compared with 1,077,740 tons in February, a short month. Still, we entered the month of April with a reduced capacity at work, it being 265,590 tons on April 1, as compared with 267,437 on March 1. This is due chiefly to the fact that a number of large Steel works furnaces in the Pittsburgh District blew out toward the end of March. The unknown factor in the situation, so far as the merchant furnaces are concerned, is the question of stocks. It is well known that there has been a considerable accumulation. Some very large figures are being talked, but in the absence of reliable data these statements must be received with reserve.

The Iron trade is watching with keen interest, and some misgivings as to their success, the efforts being made to bring about greater co-operation among the Pig Iron manufacturers. No news as to the mission of prominent interests to Birmingham has been received as yet. In the meantime the volume of business has been light, and the markets for Pig Iron in different parts of the country have been unsettled.

Outside of a round lot of Steel Rails for shipment to New South Wales the week has been barren of new business in the Rail trade. New orders for Billets are scarce and there is some shading by merchants who have made conversion arrangements.

The outlook for Structural Material is fair, to judge from the considerable tonnage which will be required for undertakings which are pretty sure to be carried out. Unfortunately many of them drag. The Brooklyn subway will call for about 40,000 tons, the Whitehall Building in New York 10,000 to 12,000 tons, Chicago track elevation for 7000 tons and the Great Falls smelter for 3000 tons.

The trade in Iron Bars, both East and West, is not in a satisfactory condition, and sharp competition is waging for what little new business is coming up. New prices have just been established on Shafting.

The makers of Cast Iron Pipe have quite a good deal of business in sight. Among the orders upon which they are figuring are 7000 tons for Manila, an aggregate of 18,000 tons for Cuban points and some round lots for South America.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Apr. 8, 1908.	Apr. 1, 1908.	Mar. 11, 1908.	Apr. 10, 1907.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	*$17.75*	$17.75	$18.25	$24.50
Foundry No. 2, Southern, Cincinnati	*15.25*	15.25	15.75	24.75
Foundry No. 2, Local, Chicago	*17.35*	17.50	17.50	26.00
Bessemer, Pittsburgh	*17.65*	17.75	17.90	23.35
Gray Forge, Pittsburgh	*15.40*	15.65	15.90	21.60
Lake Superior Charcoal, Chicago	*20.50*	20.50	21.50	26.50
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	28.00	28.00	28.00	30.00
Forging Billets, Pittsburgh	30.00	30.00	30.00	36.00
Open Hearth Billets, Phila	*29.20*	29.20	30.40	31.50
Wire Rods, Pittsburgh	35.00	35.00	35.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	*12.00*	12.00	12.25	18.00
Steel Rails, Melting, Phila	*12.75*	12.75	13.00	18.75
Iron Rails, Chicago	*15.00*	15.00	15.75	25.00
Iron Rails, Philadelphia	*17.00*	17.00	18.00	27.00
Car Wheels, Chicago	*14.00*	14.50	15.50	25.00
Car Wheels, Philadelphia	*14.00*	14.00	16.00	24.00
Heavy Steel Scrap, Pittsburgh	*12.75*	13.00	13.00	18.00
Heavy Steel Scrap, Chicago	*11.25*	11.25	11.50	16.00
Heavy Steel Scrap, Philadelphia	*12.75*	12.75	13.00	18.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.65	1.65	1.65	1.93½
Common Iron Bars, Chicago	1.65	1.65	1.65	1.81½
Common Iron Bars, Pittsburgh	1.50	1.50	1.50	1.80
Steel Bars, Tidewater, New York	1.76	1.76	1.76	1.74½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.74½
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.84½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.70
Beams, Tidewater, New York	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.70	1.70	1.70	1.90
Skelp, Sheared Steel, Pittsburgh	1.80	1.80	1.80	2.00
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.40	2.40	2.40	2.50
Wire Nails, Pittsburgh	2.05	2.05	2.05	2.00
Cut Nails, Pittsburgh	1.90	1.90	1.90	2.05
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.50	2.45
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**13.12½**	13.25	12.62½	24.50
Electrolytic Copper, New York	**12.87½**	13.00	12.50	24.00
Spelter, New York	*4.70*	4.70	4.75	6.85
Spelter, St. Louis	*4.52½*	4.55	4.60	6.65
Lead, New York	**4.00**	3.97½	3.75	6.15
Lead, St. Louis	**3.85**	3.80	3.60	5.95
Tin, New York	**31.75**	31.25	29.25	40.85
Antimony, Hallett, New York	*8.75*	8.75	9.00	22.25
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	$3.89	$3.89	$3.89	$4.09

Chicago.

FISHER BUILDING, April 8, 1908.—(*By Telegraph.*)

While the opening week of April has developed a little more business in some lines, the Steel trade, as a whole, is decidedly quiet. The local finishing mills, with but one or two exceptions, are provided with specifications sufficient only to warrant starting up for a run of a week or two at a time. The standard Rail mill at the South Works of the Illinois Steel Company is one exception, it having enough specifications on hand, and tonnage in sight to keep it going at around 70 per cent. of its capacity until near July 1. Structural orders are coming out slowly, but there is good reason to believe that a number of important contracts now being figured on will be closed soon. Fabricators are expecting the closure within a week or 10 days of about 21,000 tons of material, included in building projects and track elevation work on which provision for construction has been made. New Rail purchases are limited to small lots for prompt delivery. Among transactions of this character reported are 800 tons of high T-Rails for an electric transportation road and 700 tons of standard section Rails for a steam road; the latter being taken by the principal interest which also secured an aggregate of 5000 kegs of Bolts and Spikes during the week. A little more active buying by jobbers in the Northwest resulted in a moderate increase in business for Merchant Pipe, but Boiler Tubes move slowly and are extremely quiet. The demand for Sheets, both Black and Galvanized, is somewhat disappointing, and instead of showing improvement is hardly up in volume to the record of recent weeks. As a result of the sharp bidding among

Cast Iron Pipe founders for the small amount of tonnage in sight prices are weaker, and are quoted $1 below last week's figures. As a matter of fact, these prices are only nominal, since in bidding each interest is governed by its own individual standards of value. Trade in Old Material is given over almost exclusively to dealers, there being no buying of consequence by consumers. Although the market is in no sense strong, it is holding fairly steady, considering the depressing influences that surround it.

Pig Iron.—The market continues dull and listless, with no spirited demand from any quarter. The transactions of last week were principally composed of small lots ranging from car lots to a few hundred tons, and most of this business was for prompt or nearby delivery. Consumers are seemingly as much disinclined to buy for forward delivery at the bottom level so far reached as they were when Iron was worth $3 or $4 a ton more than it is now. Not long since $12, Birmingham basis, for No. 2 Foundry was the point fixed by many consumers at which they would come into the market. Now they talk of $11 and even $10, Birmingham, as the prospective bottom to which prices will settle before permanent reaction takes place. At the present time, however, prices for second quarter delivery still hold around $12, Birmingham, for Southern and $17.35, Chicago, for Northern Iron. The leading Southern furnaces continue to quote $12.50 to $13, but strict adherence to the latter figure means practical withdrawal from the market. One sale of 1000 tons of Northern Iron was made during the week to a Milwaukee consumer in competition with Southern Iron. The number and character of inquiries now coming out do not indicate the probability of the near approach of material improvement, and in the absence of effective support prices have a sagging rather than a rising tendency. The following prices are for April, May and June delivery, f.o.b. Chicago:

Lake Superior Charcoal	$20.50 to $21.00
Northern Coke Foundry, No. 1	17.85 to 18.35
Northern Coke Foundry, No. 2	17.35 to 17.85
Northern Coke Foundry, No. 3	16.85 to 17.35
Northern Scotch, No. 1	18.35 to 18.85
Southern Coke, No. 1	16.85 to 17.35
Southern Coke, No. 2	16.35 to 16.85
Southern Coke, No. 3	15.85 to 16.35
Southern Coke, No. 4	15.35 to 15.85
Southern Coke, No. 1 Soft	16.85 to 17.35
Southern Coke, No. 2 Soft	16.35 to 16.85
Southern Gray Forge	14.35 to 14.85
Southern Mottled	14.10 to 14.60
Malleable Bessemer	17.50 to 18.00
Standard Bessemer	19.40 to 19.90
Jackson Co. and Kentucky Silvery, 6 %	17.90 to 18.40
Jackson Co. and Kentucky Silvery, 8 %	19.90 to 20.40
Jackson Co. and Kentucky Silvery, 10 %	21.90 to 22.40

(*By Mail.*)

Billets and Rods.—No inquiries of any consequence for Forging Billets are reported in the market. The few sales that have been effected during the week comprise what may be termed filling in requirements. The adoption of the new schedules of delivered prices noted last week has been productive of no results in stimulating trade, but on what business is moving prices are reported to be rigidly maintained. We quote Forging Billets at $31.50 to $32.50, Chicago. Wire Rods continue in fair demand, with prices firm at the following quotations: Bessemer, $35; Basic, $36; Chain, $37, all at Pittsburgh.

Rails and Track Supplies.—The existing quietness in standard section Rails is unbroken by any orders of significant tonnage, and developments in this direction are not foreshadowed by inquiries that promise immediate results. There is some business coming out from time to time in light Rails, but in the aggregate the tonnage thus secured is far short of mill capacities. Prices in light Rails continue to be shaded from $2 to $3 a ton by the rerolling mills. A sale of 800 tons of high T Rails for an electric road is reported. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.65c.; car lots, 1.75c. to 1.85c.; Spikes, 1.80c. to 1.90c., according to delivery; Track Bolts, 2.25c. to 2.35c., base, Square Nuts; and 2.40c. to 2.50c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., $28; 20-lb., $29; 16-lb., $30; 12-lb., $31. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—While there is a considerable tonnage of material represented in active projects which seem about ready to come into the market, the past week has been pretty quiet so far as the closures of contracts is concerned. Milliken Brothers secured a contract for about 700 tons from the Central Colorado Power Company for transmission line towers; about 150 tons, let by the Methodist Book Concern at San Francisco, was taken by Dyer Brothers of that city. An order for 1600 tons of concrete reinforcing Bars for the Corn Products Company's new plant was awarded to the Inland Steel Company. Bids are in on an aggregate of over 21,000 tons, on the greater part of which closure is expected within the next week or 10 days. Included in this amount are 7000 tons of track elevation material, required by roads entering Chicago; 3000 tons for the Boston & Montana Smelter; between 7000 and 8000 tons for the La Salle Hotel, and about 4000 tons for the Corn Products Company. Besides these, figures are being submitted on 1700 tons for the Scanlon Building, Houston, Texas, and about 1500 tons for the Equitable, Birmingham, Ala. The Structural mill of the Illinois Steel Company, which was shut down for about 10 days, is scheduled to start up about next week, but unless there is considerable improvement in the receipt of specifications it will have but a short run. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—Plates continue extremely dull. Jobbers are devoting their energies chiefly to reducing stocks and are buying only what is imperatively needed to preserve fair assortments. What new business is being offered comes in scattering lots for prompt shipment. Enough of these, however, have been received to enable the Sheared Plate mill of the South Works to run all of last week; it will probably clear up orders on hand during the present week. Prices are reported to be firmly held, save for concessions of from $1 to $2 a ton made by some mills on narrow Plates. We quote for mill shipments as follows: Tank Plates ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.10c. to 2.20c.; from 72 to 96 in. wide, 2.20c. to 2.30c.; 3-16 in. up to 60 in. wide, 2.20c. to 2.35c.; 72 in. wide, 2.40c. to 2.50c.; No. 8 up to 60 in. wide, 2.20c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—Business in Sheets is hardly as active as it was a week or two ago. The demand is somewhat spasmodic and irregular. The policy of buying only for immediate wants still prevails, but the hope is expressed by both mills and jobbers that some improvement will follow when weather conditions become more settled. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 to 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c.; Black Sheets from store: Blue Annealed, No. 10, 2.20c.; No. 12, 2.25c.; No. 14, 2.30c.; No. 16, 2.40c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—No improvement is apparent in either Iron or Steel Bars. Mills continue to run intermittently, none of them being able to continue in operation more than a week or 10 days at a stretch. The Sylvan Mills of the Republic Iron & Steel Company, at Moline, are shut down this week, while those at east Chicago are running. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.65c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—Some improvement in the general volume of business is noted, but there is no change in the character of buying, which continues to be for current requirements. A little better demand is reported from the jobbers throughout the Northwest, which has helped to swell the average above that of recent weeks. Local trade is extremely quiet, yet the slow but steady reduction of jobbers' stocks gives promise of more activity when replenishment orders begin to come in. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 71 per cent. on Black Steel Pipe, ¾ to 6 in. From two to three points above these prices is asked for Iron Pipe.

Boiler Tubes.—The demand for Merchant Tubes is of a desultory character and consists almost wholly of small lots for actual needs. Jobbers are placing no stock orders, and even their requirements for the maintenance of stock assortments are extremely light. Outside of a few unimportant concessions made by one or two outside mills, we are advised that prices are firm and unchanged. Mill quotations for future delivery, on the base sizes, are as follows: 2⅜ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and

2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—The small shops are coming in for a moderate amount of material, indicating more activity in repair work, but the larger manufacturing interests, whose orders at this season of the year furnish the main support of the market, are buying very little. Assortment orders from the jobbers add somewhat to the total, but all in all the demand is far from satisfactory. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish up to 1½ x ½ in., 1.93c., base, Steel card; Iron Finish, 1½ x ½ in. and larger, 1.78c., base, Tire card; Channels for solid Rubber Tires, ¾ to 1 in., 2.28c., and 1⅛ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46½c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 54 per cent. off in car lots; 48 per cent. less than car lots, base territory delivery.

Cast Iron Pipe.—Last week's transactions include only a few small lettings of from 200 to 400 tons. A fair amount of miscellaneous orders was received, but in the aggregate business is extremely quiet. No prospective lettings of any consequence are reported for the near future, although quite a number of small municipal contracts are hinging upon the disposal of bond issues. The pressure of competition has resulted in another reduction of $1 a ton, and we quote, nominally, per net ton, Chicago, as follows: Water Pipe, 4-in., $27; 6 to 12 in., $26; 16-in. and up, $25; with $1 extra for Gas Pipe.

Old Material.—Aside from a moderate tonnage taken by rolling mills, there have been practically no sales made to consumers the past week. There is some trading among dealers seeking material to apply on contracts; but, including all such transactions, the business has been exceedingly quiet. In fact, there has not been enough doing to test the market, and prices are practically unchanged. It is a peculiar feature of the present condition that offers considerably under the present market attract no speculative buying, and, on the other hand, when material is actually needed there is no difficulty in securing the market price. The railroad offerings for this week include 300 tons from the Wisconsin Central, 925 tons from the Wabash and 3400 tons from the Santa Fé. We quote, per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails	$15.00 to $15.50
Old Steel Rails, rerolling	12.25 to 12.75
Old Steel Rails, less than 3 ft.	12.00 to 12.50
Relaying Rails, standard sections, subject to inspection	20.50 to 21.50
Old Car Wheels	14.00 to 14.50
Heavy Melting Steel Scrap	11.25 to 12.00
Frogs, Switches and Guards, cut apart	11.50 to 12.00
Mixed Steel	9.00 to 9.50

The following quotations are per net ton:

Iron Fish Plates	$13.50 to $14.00
Iron Car Axles	16.00 to 16.50
Steel Car Axles	14.75 to 15.25
No. 1 Railroad Wrought	11.00 to 11.50
No. 2 Railroad Wrought	10.00 to 10.50
Railway Springs	11.00 to 11.50
Locomotive Tires, smooth	14.00 to 14.50
No. 1 Dealers' Forge	9.00 to 9.50
Mixed Busheling	7.00 to 7.50
Iron Axle Turnings	6.00 to 6.50
Soft Steel Axle Turnings	6.00 to 6.50
Machine Shop Turnings	6.00 to 6.50
Cast Borings	4.75 to 5.25
Mixed Borings, &c.	4.75 to 5.25
No. 1 Mill	7.00 to 7.50
No. 2 Mill	6.00 to 6.50
No. 1 Boilers, cut to Sheets and Rings	7.00 to 7.50
No. 1 Cast Scrap	12.25 to 12.75
Stove Plate and Light Cast Scrap	10.25 to 10.75
Railroad Malleable	10.50 to 11.00
Agricultural Malleable	9.50 to 10.00
Pipes and Flues	8.00 to 8.50

Metals.—In the local market there is practically no change reported in Copper prices, but sales for the week show a slight improvement. Consumers continue to confine their orders to current needs, and there is in consequence no buying of round lots. Spelter is somewhat easier, but other metals hold reasonably steady with a moderate demand. We quote as follows: Casting Copper, 13¼c.; Lake, 13¾c. to 14c., in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 33c.; small lots, 31½c.; Lead, Desilverized, 4c. to 4.25c., for 50-ton lots; Corroding, 5.35c. to 5.45c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 5c.; Cookson's Antimony, 12½c., and other grades, 10½c. to 11c.; Sheet Zinc is $7 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 12¾c.; Heavy Copper, 12¾c.; Copper Bottoms, 11c.; Copper Clips, 11c.; Red Brass, 12½c.; Yellow Brass, 10¼c.; Light Brass, 6½c.; Lead Pipe, 3¾c.; Zinc, 3¾c.; Pewter, No. 1, 21c.; Tin Foil, 25c.; Block Tin Pipe, 27c.

Pittsburgh.

PARK BUILDING, April 8, 1908.—(*By Telegraph.*)

Pig Iron.—Conditions in the Pig Iron trade are very quiet, purchases being very light and for actual needs. Consumers are buying Pig Iron just as they require it, and are not willing to contract ahead. Only 5 of the 19 merchant blast furnaces in the Mahoning and Shenango valleys are in operation—namely, one Andrews & Hitchcock and Girard running on Foundry, while Shenango No. 3, Stewart and Youngstown Steel are on Bessemer. Stocks of unsold Pig Iron in the two valleys held by the merchant furnaces are given on April 1 as about 60,000 tons, against 75,000 tons on March 1. We quote standard Bessemer Iron at $16.75 to $17; Northern No. 2 at $15.25 to $15.50; Basic about $15.50, all at Valley furnace. Northern Forge is about $14.50, Valley furnace, or $15.40 Pittsburgh, but there have been no recent sales.

Steel.—The market continues somewhat quiet, inquiries being only for small lots for actual needs. The Republic and Youngstown Sheet & Tube Bessemer plants at Youngstown are in operation this week with a fair amount of work ahead. We quote Bessemer Billets at $28, at Pittsburgh, and $28.50, at Youngstown or Wheeling, Sheet and Tin Bars taking an advance of $1 a ton over these prices. Forging Billets are about $30, Pittsburgh.

(*By Mail.*)

Reports gathered this week as to whether the improvement in general conditions in the Iron trade, reported in the latter part of March, is being maintained, are somewhat conflicting. Some manufacturers report a small but steady increase in the volume of new tonnage being entered, while others say they have observed a decided falling off in new business, and insist that general conditions are not as encouraging by any means as they were in March. The active blast furnace capacity of the Steel Corporation is about 10 per cent. less now than it was early in March, but this is largely due to the fact that four or five of the Edgar Thomson furnaces were blown out in the latter part of March, on account of the small tonnage of Rail orders on hand. This week the three Edgar Thomson Rail mills are down for lack of work, but are scheduled to start again to partial capacity next week. The buying trade has pretty generally adopted the policy that nothing is to be gained by ordering ahead, and is placing orders only for small lots and actual needs. This condition will likely continue for some time. The situation in Pig Iron does not show any encouragement, consumers still buying only small lots for prompt shipment. There are several fair sized inquiries for Pig Iron in the market, but the ideas of the furnaces and the buyers as to prices are so widely apart that it is next to impossible to close up any large business. The statement is made that there has not been 3000 tons of Standard Bessemer Iron sold by Valley furnaces since the first of the year, and this gives a clear idea of the practically lifeless condition of the market. There is some demand for Basic and Foundry Iron, but the limited tonnage being sold is at such low prices that most of the large furnace interests refuse to meet them. The Billet trade is very quiet, only small lots being sold. Prices are being maintained by the large Steel interests, but some of the smaller mills that can roll certain sizes of Billets are still making conversion deals for Pig Iron with dealers who then market the Steel at somewhat less than regular prices. Only a limited run of orders for Finished Iron and Steel is being secured by the mills, but it is hoped that April will show some improvement over March. Coke and Scrap continue extremely dull, with not enough of either material being sold to test prices thoroughly. On the whole, the situation is not as encouraging as two or three weeks ago, but sometimes the unexpected happens, and it is possible that April will make a better record than anticipated.

Ferromanganese.—Only an occasionally small lot of Ferro is wanted. We quote 80 per cent. at $43 to $43.50, seaboard, or $44.95 to $45.45, Pittsburgh. A sale of a carload, or about 25 tons, is reported at the latter price.

Muck Bar.—Absolutely nothing is being done in the way of new sales, and we continue to quote best grades of Bar made from all Pig Iron, at nominally $27 to $27.50, Pittsburgh. If any tonnage was offering probably these prices would be shaded.

Skelp.—The general Skelp market is quiet, with all the mills badly in need of specifications. We quote nominally as follows: Grooved Steel Skelp, 1.60c.; Sheared Steel Skelp, 1.70c.; Grooved Iron Skelp, 1.80c., and Sheared Iron Skelp, 1.90c., f.o.b. Pittsburgh.

Rods.—A fair amount of business is being sold in small lots, and prices are reported as quite firm. We continue to quote Bessemer Rods at $35, Open Hearth $36, and Chain Rods $37, Pittsburgh.

Steel Rails.—Speaking from the standpoint of new orders, the situation in Rails is practically lifeless. If the plans for financing the Erie Railroad prove successful, contracts for 40,000 to 50,0000 tons of Rails will likely be given out by this road in the near future, part of this tonnage to come to the local interest. Two or three other leading lines are also stated to have their finances so arranged that they will be able to place their contracts for Rails this month. In the past week the Carnegie Steel Company took orders for about 1500 tons of Standard Sections and close to the same tonnage in Light Rails. It is stated that prices on new Light Rails are a little stronger, but nevertheless they are still being shaded by the Rerolling Rail mills about $3 a ton. Regular prices on Light Rails are as follows: 25 to 45 lb. Sections, $28; 20-lb., $29; 16-lb., $30, and 12-lb., $32. We quote Standard Sections at $28, at mill, and Angle Splice Bars at 1.65c., at mill.

Plates.—Practically all the new business in Plates is in small orders for actual needs. The Steel car interests are about out of it as buyers of Plates, and the same is true of the lake boat builders, who have practically no orders on their books. Some tonnage in Plates is coming in in Structural orders, but this is also very limited in size, and the immediate outlook for the Plate trade is not encouraging by any means. A few small mills are still shading regular prices $2 to $3 a ton. Regular prices are as follows: Tank Plates, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell grade of steel is abandoned.

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes, 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Structural Material.—The situation is a little more encouraging from the fact that a good deal of work has come up in the past week, with the probability that some large tonnage will soon be placed. The Oliver Building on Smithfield street, which has been talked of for more than a year is now up, the architect being the L. H. Burnham Company, Chicago. It is proposed to go ahead with part of this building at once, and then take up the Smithfield street frontage after April 1 of next year, when the leases of the present tenants expire. Bids have been asked on 10,000 to 12,000 tons of Steel for this structure, and at least part of this is expected to be placed soon. The contract for the piers of the Lake Erie Bridge at Beaver has been placed with the Dravo Construction Company, and it is expected that bids on the Steel, about 14,000 tons, will be asked for within the next two or three months. The Second National Bank Building at Connellsville, Pa., 420 tons, is to be placed this week. The McClintic-Marshall Construction Company has taken about 600 tons of Steel for the State Fair Buildings at Syracuse, N. Y., and about 300 tons for the Chanute Cement & Products Company, Chanute, Kan. Some other work is in sight. Complaint is still heard of the low prices that are being made on the tonnage that is being placed. The mills are able to make prompt deliveries, and in fact are shipping in material faster than the Structural concerns can take care of it. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x ¼ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—A fair amount of new business is being placed in Black and Galvanized Sheets, but the situation in this trade at this time is disappointing in the fact that the demand is not as large as the mills expected. The demand for Roofing Sheets is improving, but it is estimated that somewhat less than 50 per cent. of the entire Sheet capacity is idle. Prices are being fairly well maintained, few concessions being reported. Regular prices are as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed. Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c. No. 28 Painted Roofing Sheets, $1.75 per square, and Galvanized Roofing Sheets, No. 28, $3.10 per square, for 2½-in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—General conditions in the Tin Plate trade are better than on any other line of finished products, the actual demand in the past month having increased materially. The American Sheet & Tin Plate Company is operating this week above 85 per cent. of its Tin mill capacity, and is having a good run of new business. The independent Tin Plate mills report their demand showing betterment, and it is expected that the summer will be quite active in this trade. It is stated that regular prices are being well maintained. We quote at $3.70 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Iron and Steel Bars.—Specifications against contracts are coming in sparingly, while the new business in Iron and Steel Bars being placed with the mills continues light. Buying is of a hand to mouth character, consumers placing only small orders for actual needs. Reports that prices on Bar Iron are being materially shaded are denied. We quote Iron Bars at 1.50c. for the Pittsburgh District, and 1.47c., Pittsburgh, for Chicago and points further west. Steel Bars remain very firm, at 1.60c., Pittsburgh.

Hoops and Bands.—No new orders are being placed and specifications against contracts are coming in at only a fairly satisfactory rate. Regular prices are as follows: Steel Hoops at $2, base, full Hoop card extras; Steel Bands, $1.60, base, half Steel card extras, all f.o.b. cars, Pittsburgh, Pa., in carload lots, for delivery during 1908.

Spelter.—Buying is quiet, but it is stated there are more inquiries in the market than for some time. Prime grades of Western Spelter are quoted at 4.50c. to 4.55c., East St. Louis, to which a freight rate of 12½c. to Pittsburgh should be added.

Railroad Spikes.—Reports current here that several Western railroads have placed orders for 60,000 kegs of Spikes are not confirmed, and it is not believed that such orders have been placed. General buying is light and all the Spike mills are badly in need of orders. We quote: Standard sizes, 4½ x 9-16 in., at $1.70, and the smaller sizes at $1.80 per 100 lb. in carloads and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Merchant Steel.—Last week new prices on Shafting were adopted as follows: On contracts for 100 tons or over, 57 per cent. off; carloads, 56 per cent. off, and less than carloads 52 per cent. off, on which carload freight is allowed within base territory. The demand for Shafting is limited, and the few orders being placed are for small lots only. Very little new business is going in Merchant Steels and this trade continues extremely quiet. We quote: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 2.10c. to 2.15c. Railroad Spring Steel, 1.60c. to 1.75c., the higher price being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron, finished, 1½ in. and wider, 1.60c.; under 1½ in., 1.75c. Planished Tire Steel is 1.80c., all f.o.b. at mill.

Boiler Tubes.—The demand is light, but some business in Railroad Tubes is pending which is expected to be placed in a short time. Prices are being fairly well maintained, but concessions are being made by one or two mills. Discounts on Merchant Tubes for small lots, on which an extra 5 per cent. is allowed in carloads, are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	42	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Pipes and Tubes.—Orders for a good tonnage in Line Pipe have been placed in the past week, with considerably more pending, which is expected to be given out in a short time. The Oklahoma Natural Gas Company has bought 15 miles of 8¼-in. Casing of the Youngstown Sheet & Tube Company. The latter company has also secured a contract for 10 miles of 4-in. Line Pipe and another for 10 miles of 12-in. Line Pipe, the latter for a Kansas gas company. The Barnsdall interests have placed an order for 5 miles of 6-in. Line Pipe, while another contract for 20 miles of 3-in. Line Pipe is pending, which is expected to be placed in a short time. The demand for Tubular goods from the general trade is showing slight betterment. General conditions in this trade are better than on some other lines of Finished Prod-

ucts. We are advised that prices are being absolutely maintained. Net discounts on Steel Pipe to the large trade on ¾ to 6 in. remain at 74 and 5 per cent. off list, while on Iron Pipe the absolute minimum is 72 and 5 per cent. Discounts on Steel Pipe are as follows:

Merchant Pipe.

Jobbers, carloads.

	Steel. Black.	Galv.
	%	%
⅛ to ¼ in.	65	49
⅜ in.	67	53
½ in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
⅛ to ⅜ in.	58	46
½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
½ to 8 in.	54	43

Discounts on Genuine Iron Pipe are as follows:

	Black.	Galv.
	%	%
⅛ and ¼ in.	63	..
⅜ in.	65	51
½ in.	67	55
¾ to 6 in.	71	61
7 to 12 in.	68	53
Extra strong, plain ends:		
⅛ to ⅜ in.	56	44
½ to 4 in.	63	51
4½ to 8 in.	59	47
Double extra strong, plain ends:		
½ to 8 in.	52	41

Iron and Steel Scrap.—This trade continues extremely quiet, and, owing to the dull demand, prices have gone off to some extent, and are weaker now than at any time for the past month or more. It is stated that consumers will agree to take in a moderate amount of Scrap, but the prices they offer for it are so much below the ideas of sellers that very little actual tonnage can be closed up. We have reduced our prices somewhat, and now quote per gross ton: Heavy Steel Scrap, Pittsburgh, Sharon and Steubenville delivery, $12.75 to $13; No. 1 Railroad Wrought Scrap, $13.75 to $14; No. 1 Cast Scrap, $15 to $15.25; Cast Iron Borings, $7.75 to $8. Bundled Sheet Scrap is probably the weakest article on the whole list, and is offered at $9 a ton or lower. Steel Axles are $16.50 to $17; No. 1 Busheling Scrap, $12 to $12.25; No. 2, $9 to $9.25; Sheet Bar Crop Ends, $16.50 to $17; Iron Axles, $19 to $19.50; Low Phosphorus Melting Stock, $16.25 to $16.50; Rerolling Rails, $14 to $14.25; Old Steel Rails, short pieces for Open Hearth use, $12.75 to $13; Machine Shop Turnings, $8 to $8.50; Railroad Malleable Scrap, $12.25 to $12.50; Grate Bars, $13.25 to $13.50; Heavy Air Furnace Cast Scrap, $13.75 to $14. On April 3 the Pennsylvania Lines West sold a fairly large tonnage of Scrap, prices paid for the grades named being as follows: Heavy Steel Scrap, $13.10; Railroad Wrought Scrap, $13.75; Old Car Wheels, $14; Axle Turnings, $9.25; Cast Iron Borings, $7.50; Old Steel Rails, long lengths, $14.25, all f.o.b. Pittsburgh. We also note sales of about 2000 tons of Bundled Sheet Scrap for deliveries at Eastern points of consumption at $11.25, which is equal to about $8.50 at shipping point.

Coke.—This trade is almost lifeless, there being practically no new demand for either Furnace or Foundry Coke. Good grades of Furnace Coke are offered for prompt shipment, at about $1.60, and best grades of 72-hr. Foundry Coke at about $2.25, at oven, to consumers. Other grades of Furnace and Foundry Coke, not so high in quality, are offered at still lower prices. The output of Coke last week in the Upper and Lower Connellsville regions was 139,663 tons, a decrease over the previous week of more than 20,000 tons. Coke operators are making no efforts to start idle plants, and those that are operating are running intermittently, some of them cutting down working time to one and two days a week, while others run three or four days a week, as demand may require. It is stated that Furnace Coke loaded on cars, and which had to be moved, has been sold as low as $1.50 a ton and even lower in some cases.

Birmingham.

BIRMINGHAM, ALA., April 4, 1908.

Pig Iron.—The active capacity in this district for producing Foundry Iron has been increased approximately 65 per cent. since January 1, and reports of sales agents show the present output warranted by order book requirements. One of the leading interests reports sales for the past two months equal to the output of capacity in operation for three months. The decrease in stock accumulations conforms with statements as to condition of order books, and makers that have been independent of price agreements are believed to be practically out of the market for second quarter deliveries. However, the prices agreed upon have not been maintained, and from $12 to $12.50 is now generally considered the market price for No. 2. No sales are reported at such figures, but quotations have been made upon that basis and an offer of $11 per ton for 1000 tons is known to have been considered. A sale of 500 tons at $13, Birmingham, is reported, and carload lots of High Manganese Iron for immediate shipment are reported sold at $14. Some inquiries are pending, the principal ones being for lots of 1000, 750 and 500 tons, respectively. The attitude of purchasers as to speculative buying is apparently unchanged, and the small percentage of tonnage booked that represents such transactions is notable. The improvements in all foundry trades, though material, are gradual, and melters are inclined to increase the proportions of their engagements in a like manner. One or more inquiries previously reported for round tonnages did not result in sales, by reason of the fact that requirements as anticipated by prospective purchasers did not develop, but, with few exceptions, the tonnage engaged is being delivered according to specifications originally submitted.

Cast Iron Pipe.—The volume of business in sight increases, and the fact that contracts for export are among those to be awarded is very encouraging. The proposed improvements by the Government in the Philippine Islands are of especial interest to Southern producers. In addition to 7000 tons of Water Pipe for the city of Manila, approximately 18,400 tons is to be placed for Cuban points, and one or more contracts for round tonnages are to be placed for points in South America. Oswego, N. Y., is to take 5000 tons, and a Western railroad is to place a contract for 54 miles of Water Pipe within 60 or 90 days. The idle local capacity has been decreased during the week, and recent movement of stock accumulations is satisfactory. Low figures continue to be reached on large contracts, but for small lots quotations as appended are firm. We quote Water Pipe, per net ton, f.o.b. cars here, as follows: 4 to 6 in., $27; 8 to 12 in., $25; over 12 in., average, $24, with $1 per ton extra for Gas Pipe.

Old Material.—The market is without an encouraging feature. Indications for the resumption of operations at plants of large consumers have not materialized, and the demand continues very unsatisfactory. Some contracts have been placed, but figures have been exceptionally low, with the business going principally to dealers who have accumulated stocks since the depression. A criterion of prices is hardly offered, and we quote nominally as follows, per gross ton, f.o.b. cars here:

Old Iron Rails	$16.50 to $17.00
Old Iron Axles	15.50 to 16.00
Old Steel Axles	14.50 to 15.00
No. 1 Railroad Wrought	13.00 to 13.50
No. 2 Railroad Wrought	10.00 to 10.50
No. 1 Country Wrought	11.50 to 12.00
No. 2 Country Wrought	9.50 to 10.00
Wrought Pipe and Flues	10.00 to 10.50
No. 1 Steel	11.50 to 12.00
No. 1 Machinery	10.50 to 11.00
Stove Plate and Light Cast	9.50 to 10.00
Cast Borings	6.00 to 6.50

Cincinnati.

CINCINNATI, OHIO, April 8, 1908.—(*By Telegraph.*)

Summing up the local market situation, one finds little encouragement. In finished products the most meager buying prevails. The Coke situation is weaker, if anything, than on the opening of the month. Pig Iron is dragging at the most attractive prices, and Scrap dealers find no department of the business capable of producing any sort of reasonable sale of tonnage, save perhaps a little No. 1 Wrought and some Heavy Melting Steel Scrap, a few sales of both of which have been made in this market at a slight advance over quoted prices for spot delivery. Local dealers are watching with considerable interest the outcome of the dinner of Iron men at the Hillman Hotel, Birmingham, Wednesday night, at which President Corey of the Steel Corporation and other prominent men will be guests. In the machine tool markets there is the same story to tell—a dearth of orders and little or nothing in the inquiries that have come from all over to suggest business within three or four months. There has been a little activity in the lathe and milling machine line, and business with woodworking machinery concerns has improved materially since the first of the year.

Pig Iron.—Consumers are taking Iron on contract a trifle better, and there have been some sales of Foundry and analysis Iron for immediate needs at the market quotations, but the chief topic of discussion in local Iron circles is the reputed break of the market in the Valley District and sales of No. 2 Foundry on a basis of $15 and $15.25, at furnace. The closeness of the Valley product to the center of consumption is undoubtedly at this time a factor in the situation. So closely contested is this competition that all sorts of expedients are resorted to, it is said, to close the breach between buyer and seller without actually exposing the transaction to charges of rebating. In the Ironaton District price cutting does not seem to be so flagrant, and the admission that No. 2 Foundry may be bought at $15.50, at furnace, is qualified, "in certain territory." It is not apparent that Southern Foundry Iron is selling in this district at less than $12, Birmingham, which is an open quotation, although it is reported that $11.75 has been done. Along with these incidents it is only fair to say that sales of Northern Iron are recorded to-day at $16, at furnace for No. 2, and some

$12.50, and even $13, Iron has been sold here for quick shipment. A small lot, 50 tons of high Manganese No. 3, was sold to a Detroit melter for $17.25, delivered. Interest to-day has centered in Detroit, where a stove concern is expected to contract for 3000 to 5000 tons of analysis Iron for the last half of the year. An Ohio melter is figuring on 300 tons for last half Foundry Iron. Basic is a little stronger, and $15.50 is the best price heard to-day. An inquiry for 300 tons of Malleable is from a Michigan melter. An Eastern consumer is feeling the market for a 2000 ton lot of Basic, and an Ohio melter is said to be willing to take some also at better than $15.50. In actual transactions there is nothing moving over a few carloads at a time, outside of contracts, and large dealers talk of still lower prices before the close of the second quarter. For immediate delivery and balance of this quarter we quote f.o.b. cars, Cincinnati, as follows, the freight rates being $3.25, $1.80, and $1.20, from the Birmingham, Valley and Hanging Rock districts, respectively:

Southern Coke, No. 1	$15.75 to $16.25
Southern Coke, No. 2	15.25 to 15.75
Southern Coke, No. 3	14.75 to 15.25
Southern Coke, No. 4	14.25 to 14.75
Southern Coke, No. 1 Soft	15.75 to 16.25
Southern Coke, No. 2 Soft	15.25 to 15.75
Southern Coke, Gray Forge	13.75 to 14.25
Southern Coke, Mottled	13.25 to 13.75
Ohio Silvery, 8 per cent. Silicon	20.20 to 20.70
Lake Superior Coke, No. 1	17.20 to 17.70
Lake Superior Coke, No. 2	16.70 to 17.20
Lake Superior Coke, No. 3	16.20 to 16.70
Standard Southern Car Wheel	23.25 to 23.75
Lake Superior Car Wheel	22.00 to 22.50

(*By Mail.*)

Coke.—Reports of continued curtailment of the Furnace product come to this market, and sales are confined almost entirely to Foundry grades, which, if anything, are a trifle stronger, indicating a gradual increase in the melt. The fields most affected by this curtailment are the Connellsville and Pocahontas. Connellsville Furnace grades are quotable still at $1.70 to $1.90; Pocahontas about the same; New River, $2.40 to $2.60, all at oven. Foundry Cokes are in some isolated instances bringing fancy prices for quick shipment where melters have allowed their stocks to run bare. Choice grades of Connellsville Foundry are selling at $2.25 to $2.50; Pocahontas, $2 to $2.25; New River, $2.75 to $3.

Finished Iron and Steel.—Store stocks are low and prices are unchanged. There is very little activity in any line of Finished product. Some Structural Shapes are going South, and Iron Bars are a little stronger than last month. Dealers are generally in a rather chaotic state of mind as to future possibilities, and while anticipating business some time within the limitations of the current year, are watching carefully for indications of price cutting, which tends to keep stocks to the lowest level. Collections are improving somewhat. Dealers quote, f.o.b. cars, Cincinnati, as follows: Iron Bars, carload lots, 1.65c., base, with half extras; small lots from store, 1.85c., base, half extras. Steel Plates, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, half extras. Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c. Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c. Plates, ¼-in. and heavier, carload lots, 1.85c.; small lots from store, 2.10c. Blue Annealed Sheets (Heavy), No. 16, carload lots, 2.15c.; small lots from store, 2.50c. No. 14, carload lots, 2.05c.; small lots from store, 2.40c. No. 10 and heavier, carload lots, 1.95c.; small lots from store, 2.25c. No. 12, carload lots, 2c.; small lots from store, 2.35c. Sheets (Light), Black, No. 28, carload lots, 2.65c. Galvanized Sheets, No. 28, carload lots, 3.70c. Steel Tire, 4-in. and heavier, carload lots, 1.95c. Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.25c.

Old Material.—The Scrap market is as hard to gauge as for the past several months, and a fair average of prices is quite difficult to obtain. There being no normal or even moderate demand for any line of Old Material, it might well be called a buyer's market. The larger dealers are still buying, believing that the present levels are attractive. As nearly as it can be determined, the local market is about as follows, prices being f.o.b. Cincinnati:

No. 1 Railroad Wrought, net ton	$11.00 to $11.50
Cast Borings, net ton	4.50 to 5.00
Heavy Melting Steel Scrap	11.00 to 11.50
Steel Turnings, net ton	5.00 to 6.00
No. 1 Cast Scrap, net ton	12.00 to 13.00
Burnt Iron and Wrought, net ton	8.00 to 9.00
Old Iron Axles, net ton	15.00 to 16.00
Old Iron Rails, gross ton	14.00 to 15.00
Old Steel Rails, long, gross ton	11.00 to 12.00
Old Steel Rails, short, gross ton	11.00 to 12.00
Relaying Rails, 56 lb. and up, gross ton	20.00 to 21.00
Old Car Wheels, gross ton	13.00 to 14.00
Low Phosphorus Scrap, gross ton	13.00 to 14.00

The American Sheet & Tin Plate Company has started up eight more hot mills at its Vandergrift Works, and the entire 37 hot sheet mills in this plant are now in full operation. Of the 10 open hearth furnaces five are being operated, while the blooming and sheet bar mills are also running.

Philadelphia.

PHILADELPHIA, PA., April 7, 1908.

The demand for both crude and finished materials has been somewhat less active, and the situation is probably not as strong as it would appear on the surface. The hopeful feeling which has prevailed for some months still exists, but it is not as pronounced, inasmuch as busines which was expected to develop with the opening of spring has failed to materialize. The tonnages booked recently have been comparatively small, in fact, the smallest since the middle of January. While it is expected that there will be enough business to maintain about the present rate of production, not much hope for any genuine betterment before early fall is expressed. In some directions the present dullness is believed to be but temporary, as consumers have been taking small tonnages only, to meet early needs, and it is believed that a more active buying period will be seen in the course of a few weeks.

Pig Iron.—This market has been particularly dull. Buyers seem to take very little interest, and sales for the week have probably been the lightest for any like period for some months. Inquiry has not been as good as it was. Melters in many cases seem to have their immediate needs supplied, and are in no hurry to enter the market. The bulk of the current buying is in car load lots, with occasional orders running up to a few hundred tons. The foundry trades are still the most active buyers, and competition for such business as is offered has been very sharp. The independent furnaces continue to take the greater part of the business; and while their prices are quotably unchanged, and range from $17.75 to $18, delivered, for No. 2 X Foundry, it is believed that lower prices are being made on private terms. Southern, Virginia and Ohio Irons are now entering this market in competition with the independent furnaces, but when prices are shaded the facts are kept carefully guarded. Eastern Pennsylvania furnaces making standard grades are maintaining the established prices, based on $18.25, delivered, in this territory, for No. 2 X Foundry, but the tonnage taken on this basis is extremely small, and these producers are reported to be piling Iron quite rapidly. That this will result in the early further curtailment of production is likely, as a number of these producers say they will blow out rather than sell Iron under the established price. While there have been no sales reported of Southern Iron in any large quantity, it could be had at $12, Birmingham, for No. 2 Foundry. On small quantities some sellers hold, however, at $12.50 to $13, Birmingham. There has not been much business done in this territory by the Virginia furnaces. Recently small lots of Foundry Irons have been sold at $17.50 to $17.75, delivered, while a lot of several hundred tons of off Iron was sold for pipe making purposes. The pipe makers are still taking some moderate tonnages of both Northern and Virginia Irons. The inquiry for 4000 tons on the market last week is said to be still unclosed, while a further inquiry for 1000 tons of No. 2 X Iron is reported. Sales of 500 tons each of Coke and Charcoal Malleable are reported. Forge Iron has been extremely dull. Sales have been few and confined to small tonnages for prompt delivery. Some of the Steel mills have been coming into the market quietly for Basic Iron and it is understood that one round lot at the established price, $17.25, delivered, has recently been closed. Prices show no quotable change, the inside figures in the tabulated prices below (with the exception of Low Phosphorus Iron) being those at which business has been done by the independent furnaces, while the outside figures represent the agreed prices of the Eastern makers for delivery in buyers' yards, eastern Pennsylvania, and adjoining territory, during the second quarter:

No. 2 X Foundry	$17.75 to $18.25
No. 2 Plain	17.25 to 17.75
Gray Forge	16.25 to 16.75
Basic	17.25
Low Phosphorus	23.50 to 24.00

Ferromanganese.—There has been some inquiry for small tonnages, and sales of carloads and broken lots are again reported. The available supply of spot Ferro is said to be materially decreased. Prices, however, are unchanged, $43 to $44 Baltimore, being quoted for small lots.

Steel.—The demand continues light, and mills are unable to gain any in production. Sales recently have been confined to small lots for prompt shipment, buyers as a rule showing no disposition to anticipate their wants. Prices are unchanged. We quote, for delivery in Philadelphia and vicinity, $29.20 for ordinary Rolling Billets, and $31.20 for Forging Billets, with the usual extras for high carbons and large sizes.

Plates.—There has been no improvement in the demand. Orders are more plentiful, but the individual tonnage is small and covers only consumers' immediate needs. An order for 750 tons of Tank Plates was booked by one mill during the week, but the bulk of the business is of a miscellaneous character. Mills are able, however, to maintain their rate of

production, and prices are being fully maintained, quotations for delivery in this territory being as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.85	1.90
Flange or Boiler Steel	1.95	2.05
Commercial Firebox	2.05	2.10
Marine	2.25	2.30
Locomotive Firebox Steel	2.35	2.40

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G	.15
No. 9, B. W. G	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00

Structural Material.—There is a fairly even demand, largely of a miscellaneous character, and mills maintain an average output of about 50 per cent. of their capacity. Inquiries are fairly good, but confined mostly to small propositions, although one or two fair sized buildings are being figured on. Quotations are unchanged, 1.85c. to 2c. being named according to specification.

Sheets.—Orders come out but slowly, and are confined to small tonnages for prompt shipment. No disposition is shown by buyers to anticipate the future. Inquiries are not so numerous, and are somewhat slow in developing into orders. Prices are being fully maintained, the following range being quoted for mill shipment, with a tenth extra for small lots: Nos. 18 to 20, 2.50c.; No. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Specifications on old orders are reported to be coming out somewhat more freely, although new business continues extremely quiet. Mills are running irregularly and not gaining very extensively in tonnage. Dealers who have Bars due them at old prices are reported to be underselling about one-tenth; leading mills, however, maintain the established price, 1.65c., delivered, in this territory.

Old Material.—Not enough business has been transacted to establish prices. The demand is at a standstill, mills taking only odd lots. Prices are not considered strong, but in the absence of business are unchanged. We quote nominally as follows for prompt delivery in buyers' yards, eastern Pennsylvania and adjoining territory:

No. 1 Steel Scrap and Crops	$12.75 to $13.25
Low Phosphorus	17.50 to 18.00
Old Steel Axles	17.50 to 18.00
Old Iron Axles	20.00 to 21.00
Old Iron Rails	17.00 to 18.00
Old Car Wheels	14.00 to 15.00
Choice No. 1 R. R. Wrought	15.00 to 15.50
Machinery Cast	15.00 to 15.50
Wrought Iron Pipe	11.50 to 12.00
No. 1 Forge Fire Scrap	11.50 to 12.00
No. 2 Light Iron	9.00 to 10.00
Wrought Turnings	8.75 to 9.25
Stove Plate	11.00 to 11.50
Cast Borings	7.50 to 8.00
Grate Bars	11.75 to 12.25

Coke.—No particular change is to be noted in the demand for Coke. There have been some few contracts made for partial requirements of Foundry Coke for the remainder of the year. Some little business has also been done for prompt shipment. Furnace Coke is inactive. Foundry Coke is quoted at $2.25 to $2.50 at oven, with $1.75 to $2 at ovens named for Furnace Coke. For delivery in the Philadelphia territory the following range of prices is quoted:

Connellsville Furnace Coke	$3.90 to $4.15
Foundry Coke	4.40 to 4.65
Mountain Furnace Coke	3.50 to 3.75
Foundry Coke	4.00 to 4.25

Cleveland.

CLEVELAND, OHIO, April 7, 1908.

Iron Ore.—But little more Ore is being shipped from the docks than a month ago. There are no inquiries for Ore, and merchant firms are not expecting to make any sales before May. A large share of the furnace interests have enough left over from last year to run them until September, and some will not need this season's Ore until considerably later than that. There seems to be a disposition among furnacemen to wait until well along in the summer before buying any 1908 Ore. Few vessels will start out with the opening of navigation. The package freighters will not be started until April 25. Indications are that there will not be much activity in lake shipments before June 1. Boats managed by the Ore firms will not be placed in commission until well along in May. We quote Ore prices at Lake Erie docks for 1908 delivery, per gross ton, as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range Non-Bessemer, $4.20; Mesaba Non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous Non-Bessemer, $2.35 to $2.60.

Coke.—There is some demand for Foundry Coke in small lots, but no sales of Furnace Coke are reported. We quote Connellsville Furnace Coke for spot shipment at $1.60 to $1.75, at oven, although there are reports of its being offered at $1.55. We quote Connellsville 72-hr. Foundry Coke at $2.25 at oven.

Pig Iron.—The intricate system of prices adopted by the Cleveland conference several weeks ago has fallen to pieces. Local furnaces maintained the prices for some time, in spite of the fact that Valley furnaces were selling much below the schedule, but no pretense is now being made to maintain the price agreement. Northern No. 2 Foundry Iron is quoted at $15 to $15.50, Valley furnace, but there are reports of a lower price quoted for shipments outside of the immediate territory. One small sale was made by a Valley furnace to a local consumer at $16.25, delivered, or $15.35, at furnace. Only one sale of any size is reported by a local furnace. That was of several hundred tons of No. 2 Foundry for shipment outside this territory at a price not made public. Shipping orders on contracts show no improvement over last month, and some of the largest consumers are taking no Iron. There is a disposition among large melters who carried heavy stocks of Pig Iron during busy times, when deliveries were slow, to buy only small lots for immediate delivery. The furnace of the Cleveland Furnace Company will go out of blast April 9. This furnace runs mostly on Foundry Iron. The Upson Nut Company, which had under consideration the question of blowing out its River Furnace, has decided to keep it in blast. There is little inquiry for Southern Iron, and no demand for Bessemer or Basic. For prompt shipment and for the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	$17.75
Northern Foundry, No. 1	$16.50 to 17.25
Northern Foundry, No. 2	16.00 to 16.75
Northern Foundry, No. 3	15.50 to 16.25
Southern Foundry, No. 2	16.35 to 16.85
Gray Forge	15.65

Old Material.—The market shows no improvement. Consumers are limiting their purchases to small lots for immediate needs, dealers seldom getting an inquiry for over a carload. Dealers are complaining of the small margin between the buying and selling price. Prices are unchanged from a week ago, but quotations are largely nominal, and consumers often succeed in picking up what they want at a little lower than the quotations given. Dealers are doing no speculative buying for their stock yards except occasionally when some Scrap is offered them at a very low figure. Dealers' prices to the trade are as follows, per gross ton, f.o.b. Cleveland:

Old Steel Rails	$11.00 to $11.50
Old Iron Rails	15.00 to 16.00
Steel Car Axles	17.00 to 18.00
Old Car Wheels	13.00 to 13.50
Relaying Rails, 50 lb. and over	21.00 to 22.00
Heavy Melting Steel	11.00 to 11.50
Railroad Malleable	12.00 to 12.50
Agricultural Malleable	11.00 to 12.00
Light Bundled Sheet Scrap	7.50 to 8.50

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	$16.00 to $16.50
Cast Borings	5.00 to 5.50
Iron and Steel Turnings and Drillings	7.00 to 8.00
Steel Axle Turnings	7.50 to 8.00
No. 1 Busheling	10.50 to 11.00
No. 1 Railroad Wrought	12.00 to 12.50
No. 1 Cast	12.00 to 12.50
Stove Plate	10.00 to 10.50
Bundled Tin Scrap	8.00 to 9.00

Finished Iron and Steel.—While the improvement over a month ago is slight, a somewhat better feeling seems to prevail. Nearly all orders that are being placed are for small lots for immediate needs. Both the local Bar Iron mills are running this week, but from present indications will be closed down for the next two weeks. The mills of the Otis Steel Company, which had been shut down for a week, and of the Cleveland Steel Company are running this week. The latter plant was running three weeks in March, and a slight improvement in orders for Light Sheets indicates that it will be able to increase its output this month. While the price of 1.50c., Pittsburgh, is being fairly well maintained by the mills, concessions on Iron Bars are still being made by jobbers. Concessions of $2 a ton are being made by some of the smaller mills on Light Plates. The price of Steel Bars is being firmly maintained. The demand for Plates is light. Lake shipbuilding interests have specified for the greater part of the Plates and Shapes needed for the boats under construction for this year's delivery, and the demand from that source from now on is expected to be very limited. The general Structural situation is very quiet, and the prospects for much improvement in the demand are not very bright. Jobbers report a fair demand for Blue Annealed Sheets, but little improvement in the demand for other material. We quote Iron Bars at 1.50c. to 1.60c., Cleveland, for car lots; Steel Bars, 1.70c., Cleveland, for car lots, half extras; Beams and Channels, 1.80c., base, Cleveland, and Plates, ¼-in. and heavier, 1.80c., Cleveland. We quote Sheets, mill shipments, car lots, Cleveland, as follows: Blue Annealed, No. 10, 1.90c.; Box Annealed, No. 28, 2.60c.; Galvanized, No. 28, 3.65c. The store price on Steel and Iron Bars is 1.75c. to 1.80c. The lower price, however, is being shaded in some cases for good orders. Warehouse

prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.85c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

New York.

NEW YORK, April 8, 1908.

Pig Iron.—Outside of one lot of 5000 tons of Basic Pig there have been no transactions of any magnitude. Buying is confined to moderate lots, nearly all the business being taken by Southern and independent makers. We quote at tidewater as follows: No. 1 Northern Foundry, $18 to $18.50; No. 2 Foundry, $17.25 to $18.25, and No. 2 Plain, $17 to $17.50. Alabama Irons are $17.25 to $17.50 for No. 1 Foundry, and $16.25 to $16.50 for No. 2 Foundry.

Steel Rails.—An order for 6000 tons of standard Rails for the Government of New Zealand has been taken by the Pennsylvania Steel Company, the Rails to be rolled at Sparrow's Point. The Interborough Rapid Transit Company has not yet placed the contract for 1000 tons of Bessemer and 500 tons of Open Hearth Rails, on which bids were received a short time ago. Some little business in Light Rails has been done in the past week.

Structural Material.—Gauged by the amount of work that has been figured on or for which plans are known to have been prepared, the Structural situation is nearer normal than that in other departments of the market. However, it is the postponement of actual contracts that causes the Structural market to drag, so that bookings, meantime, are at a rate less than 50 per cent. of that of last year. The decision of the Public Service Commission to call for bids for the construction of the Fourth Avenue Subway in Brooklyn is interesting to Structural works, as 40,000 tons of Steel will be required. The line will run from the Brooklyn terminal of the Manhattan bridge to Ashland place, and thence under Fourth avenue as far as Forthy-third street. The work will be divided into six sections, and bids on all will be opened May 8. The estimated cost is $15,000,000. An important building enterprise for which plans are in readiness for early contracting is the erection of a 36-story structure at Washington and West streets by the Chesebrough interests, owners of the present Whitehall Building. From 10,000 to 12,000 tons of Steel will be needed. In the past week the factory building of Blanchard & Co., Brooklyn, 1200 tons of Steel and Iron, including 400 or 500 tons of Cast iron columns, was let to the receivers of Milliken Brothers. The Pennsylvania Steel Company has taken six small bridges for the Lehigh Valley—400 to 500 tons—and 500 tons for this road's viaduct over the Central of New Jersey is still pending. We continue quotations, as follows, for tidewater deliveries on mill shipments: Beams, Channels, Angles and Zees, 1.86c.; Tees, 1.91c. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Material cut to length is sold from stock at 2¼c. to 2½c.

Bars.—The Bar Iron market is quite unsettled, as the smaller mills are apparently anxious for business, and are making prices more attractive to customers than the 1.50c., Pittsburgh basis, which is the nominal price of Eastern makers. The little business now being done is on the basis of about 1.50c., New York. Even the concessions, which are now being made, are not bringing out many orders. It is stated that the consumption has fallen to such low proportions that those who usually require up to 500 tons a month are doing well if they take a carload. Steel Bars are unchanged at 1.60c., Pittsburgh, or 1.76c., tidewater.

Plates.—The market continues quiet, with only an occasional order for a small lot. The largest transaction reported called for something over 100 tons for a shipyard. Prices are still held as follows on standard sizes of Plates at tidewater: Sheared Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—The city of New York bought 1000 tons on Friday at about $24 per ton delivered. No other local business of any importance is in sight, while inquiries for small lots are not plentiful. The Pipe trade quickly feels the influence of fluctuations in the price of Pig Iron, and as Pipe makers have observed some stiffening in Southern Iron the past week they have accordingly advanced their prices on Pipe. Quotations on carload lots of 6-in. are now $24.50 to $25 per net ton at tidewater. It is deemed likely that this slight stiffening in prices may hasten Pipe buyers to place orders for their necessary requirements.

Old Material.—Steel Scrap is in somewhat better demand, but only in small lots and without any improvement in prices. Borings and Turnings are a trifle more active, but Foundry stock is quiet. Stove Plate appears to be a drug, as important consumers in this line are doing little or nothing in turning out new work. Practically no demand for Wrought Scrap is experienced by the dealers, as railroad companies have for a long time been forcing accumulations of Old Material on the market, much of which has been purchased directly by mills. Heavy railroad lists are again coming out, showing that the companies continue their policy of endeavoring to convert everything available into cash. It is stated that some important manufacturing establishments are following the example of the railroads and are scrapping their worn out machinery. Old Car Wheels are in very little demand, but are offered in such quantities that prices are lower. Relaying Rails are in some demand in small quantities, with an occasional sale as large as 1000 tons. They are still in ample supply. Dealers report that the local yards are not showing much of an accumulation of Scrap, notwithstanding the long continued slack demand. From the manner in which Scrap is being forced for sale by railroad companies, it would seem likely that when an improvement in business does take place prices will jump rapidly, as the supply will be short. We quote as follows per gross ton New York City:

Old Girder and T Rails for melting	$9.50 to $10.50
Heavy Melting Steel Scrap	9.50 to 10.50
Old Steel Rails, rerolling lengths	10.50 to 11.50
Relaying Rails	19.00 to 20.00
Old Iron Rails	14.00 to 15.00
Standard Hammered Iron Car Axles	16.00 to 17.00
Old Steel Car Axles	14.00 to 14.50
No. 1 Railroad Wrought	11.50 to 12.50
Iron Track Scrap	9.50 to 10.50
No. 1 Yard Wrought, long	10.50 to 11.50
No. 1 Yard Wrought, short	9.50 to 10.50
Light Iron	5.00 to 6.00
Cast Borings	4.50 to 5.50
Wrought Turnings	6.00 to 7.00
Wrought Pipe	9.00 to 10.00
Old Car Wheels	14.00 to 15.00
No. 1 Heavy Cast, broken up	13.50 to 14.50
Stove Plate	10.50 to 11.50
Locomotive Grate Bars	10.00 to 11.00
Malleable Cast	11.50 to 12.50

Iron and Industrial Stocks.

NEW YORK, April 8, 1908.

The stock market has been exceedingly quiet for several days, with slight fluctuations. A deterring influence on speculative movements has been the uncertainty regarding the outcome of the Erie Railroad Company's financial complications. Fear that the company might be placed in the hands of receivers, and thus cause apprehensions of a similar fate overtaking other railroad companies, has undoubtedly pervaded financial and investment circles. The range of prices on active iron and steel stocks from Thursday of last week to Tuesday of this week has been as follows: United States Steel common 32⅝ to 34⅛, preferred 97⅜ to 98½; Car & Foundry common 31¼ to 33; Locomotive common 42¼ to 44¾, preferred 91¼, ex-dividend, to 93¼; Steel Foundries preferred 30; Cambria Steel 28¼ to 29; Colorado Fuel 22⅞ to 24⅞; Crucible Steel common 5⅛ to 5¼, preferred 36¼ to 37; Pressed Steel common 23 to 23¾, preferred 76 to 79; Railway Spring common 32¾ to 34; Republic common 17⅝ to 18¾, preferred 68½ to 70⅞; Sloss-Sheffield common 44½ to 46½; Cast Iron Pipe common 23⅝ to 25⅛, preferred 68 to 69; Can common 4¾ to 4⅞, preferred 49½ to 50. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 33¾, preferred 98⅛, bonds 95⅛; Car & Foundry common 32¾, preferred 94½; Locomotive common 44½, preferred 91½; Colorado Fuel 23¼; Pressed Steel common 23, preferred 79; Railway Spring common 33¼; Republic common 18¼, preferred 69⅛; Sloss-Sheffield common 44½; Cast Iron Pipe common 24, preferred 68; Can common 4⅞, preferred 49¾.

L. A. Cole, president of the National Lead Company, in his annual report to stockholders says the volume of business for the year 1907 exceeded that of any in the company's history, notwithstanding the paralyzed condition of trade in the months of November and December. The financial statement shows net earnings of $2,942,245, an increase of $442,613, and a balance after preferred dividends of $1,236,513, an increase of $132,625. The company disbursed $981,131 among holders of the common stock, an increase of $361,469. This brought the surplus for the year down to $255,382, a decrease of $228,844. The total surplus now stands at $4,294,204. Concerning the outlook, President Cole says: "At this writing a comparison so far this year with the unprecedented volume of business done last year at the same time shows a shrinkage of 13½ per cent., which we hope to overcome as the season progresses, in view of the constantly improving conditions."

The committee for the readjustment of debt of the Westinghouse Electric & Mfg. Company, of which James N. Jarvie is chairman, has given notice that a majority of the convertible bonds, collateral notes and bills payable, and a large amount of the debenture certificates and accounts payable having been deposited under the plan and agreement of January 20, it has extended the period limited for the deposit of obligations and claims to May 15, with the Bankers' Trust Company of New York, the First Trust and Savings Bank of Chicago, the First National Bank of Pittsburgh, and the

National Shawmut Bank of Boston. The new plan for reorganization does away with the issue of mortgage bonds and reduces the amount of assenting stock to which stockholders must subscribe from $7,000,000 to $6,000,000. Under the new plan $10,000,000 of stock will be issued, but of this amount $4,000,000 will be taken care of by the merchandise creditors.

The net profits of the Canadian Westinghouse Company for the fiscal year ended December 31, 1907, were $427,058, an increase of 23 per cent. over the preceding year, according to a report from Hamilton, Ont., where the annual meeting of the stockholders was held March 31. Dividends paid during the year amounted to $215,221; $200,000 was set aside as reserve for depreciation and $20,000 as reserve for inventory. The deficiency of $8168 was deducted from previous surplus, and a balance of $391,284 was carried forward to profit as of January 1, 1908.

Dividends.—The Morse Twist Drill & Machine Company, New Bedford, Mass., has declared a quarterly dividend of 2½ per cent.

Metal Market.

NEW YORK, April 8, 1908.

Pig Tin.—More activity in trade, with a larger tonnage, was recorded in the last week than any time since the October panic. It is estimated that the week's turnover amounted to 1000 to 1200 tons, much of which, however, was for future shipment. The activity at the Tin Plate mills, of course, is responsible for a large share of this, although there is some mystery as to whether a considerable proportion of the business was speculative or was for consumption. Price changes during the week for 5-ton lot spot delivery New York, have been as follows:

	Cents.
April 2	31.50
April 3	32.10
April 6	32.10
April 7	31.50
April 8	31.75

Business of the week was largely confined to buying in New York City, there being no general demand from a large number of widely separated consumers, such as often springs up. Arrivals so far this month aggregate 980 tons, and there are afloat for American ports 1576 tons. The two London steamers sailing on April 8 and April 13 bring only small cargoes, and no steamer will sail on the 18th, so a shortage is foreshadowed during the latter part of the month, particularly if this present demand should keep up. The London market has been firm and not subject to the wild manipulations recorded in the previous week. That market closes to-day about £1 15s. above last week's close at £143 for Spot and £142 for Futures, Futures having moved up more in proportion than Spot.

Copper.—Prices are undeniably lower, but there seems to be a stubborn resistance to the decline. Lake is relatively the firmer, and held at more of a spread above Electrolytic than usual, being quotable at 13.12½c. to 13.25c., while Electrolytic is obtainable at 12.87½c. and possibly ⅛c. under for foreign shipment. Casting can be had at 12.75c., although there is an odd lot in the market that probably could be bought for 12.62½c. Some export business was done Tuesday within these limits, and American consumers were likewise offered Electrolytic at 12.87½c. Lake producers apparently have reduced their surplus more than the other sellers, but even they still have considerable metal on hand. It is estimated that beginning with May there will be an accumulation of nearly 10,000 tons of Copper monthly, unless either the European demand or consumption should pick up. This, of course, takes into consideration the increased production from the Butte District, and also some increase in Nevada. Foreign consumers have done very well in buying, exports so far this month aggregating 5068 tons. It is pointed out that whenever prices have declined to low figures European consumption has increased rapidly, and with subsequent higher prices the consumption has never fallen back to the previous level. Some interesting figures on the supplies of foreign Copper into Germany are given by L. Vogelstein, agent for Aaron Hirsch & Sohn, Halberstadt, Germany, those for January and February, 1908, being 28,400 tons, and in the corresponding time the previous year 16,044 tons. This is the German supply, according to Custom House returns, and while there is said to have been an increase in Copper melting in Germany no one believes that it has been as great as this, nearly 80 per cent. It really means that whereas during 1907 supplies both visible and invisible were down to a low figure Germany is now piling up stocks. The London market is but little changed from last week, closing to-day at £58 17s. 6d. for spot and £59 7s. 6d. for futures.

Waterbury Average.—The Waterbury average for March was 13c.

Lead.—The market is firm, with Desilverized Lead scarce, and all grades held firmly at 4c., New York. The St. Louis market is likewise firmer at 3.85c. Several inquiries have been in the market for good sized lots, and the demand continues to improve.

Spelter.—The cutting which has prevailed in the Spelter market for months continues more or less, and taken altogether the conditions in New York are unsatisfactory, as so much metal is still held here that was bought at considerably lower prices. The St. Louis market is quoted nominally at 4.55c., but 4.52½c. probably could be done. In New York the market is quotable at 4.70c. to 4.75c.

Nickel.—Prices are unchanged at 45c. for ton lots and 50c. to 60c. for smaller quantities.

Antimony.—Business is very dull, but prices are unchanged at 8.75c. for Hallett's, 8.75c. to 9c. for Cookson's and 8.50c. for outside brands.

Ferroalloys.—The price of 80 per cent. Ferromanganese has again weakened, and $42.50, seaboard, has been done. There is little business from dealers in 50 per cent. Ferrosilicon, and the market is nominally quoted at $80, Pittsburgh.

Tin Plate.—The Bright Tin Plate trade has recovered its equilibrium more quickly than any other branch of the Iron or metal trades. Terne Plates continue to lag, however, because of unsatisfactory conditions in the building trades. The consumption of Tin Plates by oil exporters is at a record breaking pace. Prices are unchanged at $3.89, New York, and $3.70, Pittsburgh, for 100-lb. IC Coke Plate. In Swansea Welsh Plates are unchanged at 12s. 7½d.

Old Metals.—Little change is observed, except a slight easing in the price of Heavy Copper and Copper Wire. Trade is dull, although a sprinkling of small orders keeps up a semblance of activity. Dealers' selling prices are as follows:

	Cents.
Copper, Heavy Cut and Crucible	12.50 to 12.75
Copper, Heavy and Wire	12.25 to 12.50
Copper, Light and Bottoms	11.50 to 11.75
Brass, Heavy	9.50 to 9.75
Brass, Light	7.50 to 7.75
Heavy Machine Composition	11.75 to 12.00
Clean Brass Turnings	8.25 to 8.50
Composition Turnings	9.00 to 10.00
Lead, Heavy	3.80
Lead, Tea	3.55
Zinc Scrap	3.50

B. A. Wallingford, Jr., of the firm of Walter-Wallingford & Co., Pig Iron and Coke, who has recently moved from Cincinnati to take charge of that firm's office in Pittsburgh, has been elected vice-president of the United Iron & Steel Company. Walter-Wallingford & Co. have been appointed agents for the sale of Cherry Valley Pig Iron made by the United Iron & Steel Company in all territories except New England and the East. Harry O. Price, resident agent for Walter-Wallingford & Co., remains with that firm in the same capacity as heretofore.

The Iron City Steel Company, Bessemer Building, Pittsburgh, dealer in new and Relaying Rails, has increased its capital stock, and is arranging to move into larger quarters in the same building, when it will be in a better position to care for the new departments in Bars, Shapes, Sheets, Pig Iron, &c., which it recently added.

The suit of the Babcock-Wilcox Company against the receivers of the New York State Steel Company, Buffalo, to recover possession of a battery of five boilers installed by the former in the new plant of the steel company, has been decided in favor of the plaintiff. The receivers for the steel company claimed that the boilers, after being installed and bricked in, became part of the realty of the company, but the finding of the special master in the case was that the title had not passed from the plaintiff, that there was no delivery or acceptance of the property, and awarded the boiler company possession. The amount involved was $41,000.

The Ajax Mfg. Company, Cleveland, Ohio, builder of forging machines and bulldozers, reports a very satisfactory increase in its foreign business the past two weeks. The company has taken orders for three machines for Korea, two for Egypt and several for England. An improvement is also seen in domestic inquiries. The company's plant is now being operated at about 70 per cent. of its full capacity.

McCoy & Brandt, manufacturers' agents, 619 Ferguson Building, Pittsburgh, have secured the agency in the Pittsburgh District for the sale of steam pumps made by the Vance Steam Pump Company, Battle Creek, Mich.

Customs Decisions.

Corundum Ore.

It has been decided by the Board of United States General Appraisers that corundrum ore imported by the American Cutlery Company, Chicago, must stand duty at the rate of 1 cent per pound as assessed by the Collector of Customs. The protestants claimed free entry, either under paragraph 671 or 550, or that duty should have been assessed at the rate of 10 per cent. as an unenumerated unmanufactured article. After a consideration of the testimony the board reaches the conclusion that the classification as imposed is correct.

Dross Composed of Tin and Lead.

The General Board has decided that dross composed of tin and lead is not entitled to free entry as "black oxide of tin," or "grain tin," but is dutiable properly as "metals unwrought, not specially provided for," at the rate of 45 per cent. ad valorem. In overruling the protest, which is filed by Kahn Brothers, New York, the board refers to previous decisions having a bearing on the case at issue, and points out that there appears to be no reason to extend the court's ruling holding 38.39 per cent. is controlling. The decision says that tin dross contains no lead and is composed of metallic tins. The plea is made in all of the importers' papers that the merchandise should be returned free of duty under the provisions in the tariff law for "black oxide of tin," or "grain or granulated tin." The board holds that the correct claim was not made, and the protest is accordingly overruled.

Planished Copper Plates.

Importers of so-called planished copper plates have been defeated in an effort for free entry or lower duty on the articles. The test case before the board stood in the name of B. F. Drakenfeld & Co., New York, but other firms are reported to have a direct interest in the question of classification. The Custom House authorities returned the plates for duty at 45 per cent. as being manufactures of metal. On the other hand, the importers maintained that the merchandise should be granted free entry under the tariff provision for "copper plates not manufactured." Several alternative claims are made, among them that the plates are dutiable at 25 per cent. as composition metal "plates engraved or lithographed for printing." Other claims are that the article is entitled to enter under the provisions for "copper in rolled plates," or "composition metal." None of the contentions raised are regarded by the board as controlling and they are accordingly overruled. General Appraiser Fischer, who writes the decision for the board, discusses the tariff classification of merchandise of this kind at considerable length. In part, he says:

> That the articles are copper plates not manufactured is the claim most seriously relied upon by the importers in this case. It appears that these plates are planished, and in this advanced state they are ready for engraving. It further appears from the evidence before us that a somewhat elaborate process of grinding and polishing which greatly enhances the value of the articles is necessary in order to make the plates ready for the engraver's use. In other words, in their condition as imported, the plates have been advanced by a process of manipulation—a patented process—from the status of copper in plates not manufactured. . . . We believe that paragraph 532 is to be read so as to include only such things as are crude or plate forms of copper obtained either by casting or rolling, and is not to be construed so as to include plates of copper which have been subjected to further processes resulting in an article advanced beyond such forms. In our opinion, the qualifying words "not manufactured," as found in that paragraph were intended to specifically limit such provisions to plates which, like all the other articles mentioned in the paragraph, to wit: "bars, ingots or pigs," are crude or raw materials, and not articles advanced beyond that state.

Table Steels.

A protest by the Flagg Cutlery Company, New York, protesting against the imposition of a high duty on table steels without handles was overruled and the classification imposed by the collector affirmed.

The National Transit Company has started work on an addition to its plant at Oil City, Pa., to cost about $300,000. The company makes pumps and machinery for pumping stations in the oil fields of different States, and when running full employs about 500 men in its shops.

Trade Publications.

Kno-Burn Steel Lath.—Northwestern Expanded Metal Company, Chicago. Booklet. Gives data and information relative to the use of expanded metal for steel laths, reinforced concrete and general construction work. Attention is called to the fact that the cost between combustible and incombustible building construction material is gradually but steadily narrowing, and necessary precaution against fire demands the extended use of steel and concrete in building construction. Diamond mesh Kno-Burn lath is made of No. 24 gauge steel, 21 to 24 in. wide and 96 in. long, and is packed nine sheets in a bundle. D. D. lath is made of 24 to 27 gauge and is packed nine sheets in a bundle containing 24 yards. A special beam clip and suspension bar for suspending ceilings from solid rolled beams or concrete slabs is described and illustrated.

Feed Water Regulators.—Williams Gauge Company, Pittsburgh, Pa. Circular. Delivers an argument for applying economy in general and facts establishing its accomplishment in particular where the Williams safety automatic feed water regulators, pump governors and steam traps are used. The feed water regulators are claimed on the average to pay for themselves in six months. A leaflet inclosed with the circular gives facsimiles of duplicate orders received, aggregating in all 71 of these regulators.

Portland Cement.—Lawrence Cement Company, 1 Broadway, New York. 1908 catalogue of Dragon Portland cement. Size, 5 x 8 in.; pages, 126. The early history of Portland cement is interestingly outlined, and the uses and economy of it. Dragon Portland cement, as the catalogue continually repeats, has been used over 18 years. Directions for testing cement and reports of tests on the Dragon cement are included, and a large number of illustrations show buildings and bridges in which it has been used. A list of other places in which it has been used and a number of testimonial letters are appended.

Lathes.—Seneca Falls Mfg. Company, Seneca Falls, N. Y. Catalogue No. 21B. Size, 6 x 9 in.; pages, 31. Refers to the company's line of Star and Seneca Falls lathes. The first are made for foot or power, in sizes from 9 to 11 in. swing. The Seneca Falls screw cutting engine lathes are made in 12, 14 and 16 in. swing. Speed lathes, wood turning lathes, and attachments and accessories are also illustrated and described. The latter include tool holders, milling and gear cutting attachments, rests, chucks, dogs, tools, &c.

Electrical Apparatus.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Folders and catalogues. The seven folders deal respectively with Westinghouse 250-volt direct current arc lamps, Westinghouse precision meters, Westinghouse alloy No. 18 for babbitted bearings, electro-static voltmeters, Wattmeters, Westinghouse motors and mill motors. One catalogue is devoted to an article on gas-driven electric power systems as exemplified in the Warren & Jamestown Street Railway, and the other gives illustrations and descriptions of electric drive in textile mills.

Concrete Piles.—Foundation Company, 115 Broadway, New York City. Catalogue. Size 6 x 9 in.; pages 88. Concerns the Simplex concrete pile foundation, wharf and trestle systems of the Simplex Concrete Piling Company, Tacony, Philadelphia, Pa. Illustrations show various installations of these piles, buildings which have been built on them, and tests of carrying capacities. The descriptive matter pertains to the two principal methods of putting in Standard Simplex piles, these being the alligator form and the cast iron point driving form. In the first method after the form has been driven to the desired depth and the concrete has been deposited by means of buckets, the alligator point is pulled up with the driving form; the other method differs only in that the cast iron point remains in the ground. Shell, molded, jointed and composite piles are also dealt with. Some testimonial letters are included.

Motors.—Barrett Electric Mfg. Company, Cincinnati, Ohio. Bulletin No. 106. Refers to polyphase induction type N motors, which are made in all sizes from ½ to 50 hp. for two or three phase circuits and are supplied for all standard voltages. A table of code words and ratings is given.

Boilers.—Rust Boiler Company, Pittsburgh, Pa. Pamphlets. One gives a report of tests on a Rust water tube 335-hp. boiler, and the other contains descriptive matter and sectional views through types B and C Rust boilers.

Gas Engines.—S. M. Jones Company, Toledo, Ohio. Catalogue. Deals with Rathbun vertical gas engines, which are built in two and three cylinder types in sizes from 50 to 300 hp., and twin three-cylinder engines in sizes from 150 to 600 hp. The parts are described separately and illustrations show the different types.

Water Gauges.—Automatic Steam Appliance Company, Allegheny, Pa. Circular. Pertains to the Reliable self-closing and tempering protective water gauge for use on locomotives, stationary and marine boilers, steam separators, pressure tanks, &c.

Indicators and Appliances.—Trill Indicator Company, Corry, Pa. Catalogue. Size 6 x 9 in.; pages 31. Gives illus-

trations and descriptions of the company's Triumph steam engine indicators, Faultless reducing wheels, improved planimeters, Triumph cord take-up, indicator cocks and supplies, and carrying cases. Several pages give information on the taking and reading of indicator cards.

Mining Machinery.—Chalmers & Williams, Chicago. Catalogue No. 1, section 1, first edition, devoted chiefly to a description of the Kennedy gyratory crusher, a new design of this type recently brought out. It also contains description and illustrations of auxiliary equipment for ore and rock crushing plants, with outline drawings showing the manner of installation best adapted to such machinery.

Gauge Testers.—Crosby Steam Gage & Valve Company, 16 Dey street, New York. The March issue of the *Crosby* contains illustrated descriptions of the Crosby pressure gauge tester, Crosby vacuum pump, Crosby fluid pressure scales, Nos. 1 and 2, a boiler test pump, Crosby bench test pump, and inspector's test pump.

Oiling Devices.—Wm. W. Nugent & Co., Chicago. Catalogue No. 7, January 1, 1908. Size, 6 by 9 in., 96 pages. Paper covers. Embraces a very complete line of oiling and lubricating devices which include designs adopted for the oiling of crank and cross head pins, eccentrics and guides on all types of engines. The method of attachment in various positions is shown in a large number of drawings and illustrations. The catalogue is prefaced by an interesting article on how to oil an engine, which is written from a practical viewpoint, and embraces the experience of the writer as an operating engineer as well as that gained in designing oiling devices. Diagrams for piping the direct pressure oiling system on high-speed center crank engines and cross compound Corliss engines are shown in a supplemental sheet in the back of the catalogue.

Ferroalloys.—Western Foundry Supply Company, Cliff and John streets, New York City. Pamphlet. Deals with the use of ferroalloys in the foundry, including 80 per cent. ferromanganese, ferrosilicon and ferrochrome, explaining their advantages and how to obtain the best results with them. For brass foundries 30 per cent. manganese-copper and manganese-oxide are similarly discussed. Prices are appended.

Spiral Pipe, &c.—American Spiral Pipe Works, P. O. Box 485, Chicago, Ill. Catalogue. Contains descriptions and illustrations of spiral riveted pipe, forged steel pipe flanges, and hydraulic and exhaust steam supplies. Installations of spiral riveted pipe and results of tests are shown.

Gas, Gasoline and Oil Engines.—St. Marys Machine Company, St. Marys, Ohio. Catalogue. Size 6¼ x 9¼ in.; pages 32. Pertains to the construction and operation of the company's engines, and gives illustrations and descriptions of duplex engines, kerosene oil engines, traction engines, electric light engines, stationary, portable and pumping engines, Unique engines with fire pumps, engines for mining and hoisting purposes, Unique engines with pumping jacks, semiautomatic engines and Lukens clutch pulley.

Coal and Ashes Handling Machinery.—Jeffrey Mfg. Company, Columbus, Ohio. Catalogue. Size 6 x 9 in.; pages 56. Illustrates installations of Jeffrey coal and ashes handling machinery in power houses, breweries, engine works, distilleries, mills, gas and electric plants, refineries, office buildings, &c.

Electrical Apparatus.—Fort Wayne Electric Works, Fort Wayne, Ind. Three bulletins. No. 1097, superseding No. 1060, pertains to the type KM-1 portable Wattmeter calibrators. No. 1099, superseding No. 1029, deals with the type DCM-form C inclosed direct current multiple arc lamps for 110 and 220 volts. No. 1101, superseding No. 1082, refers to the company's multiple system of alternating current inclosed arc lighting for street service.

Steel Car Underframes.—Ralston Steel Car Company, Columbus, Ohio. Pamphlet. Shows various types of steel underframes which have been designed for baggage, mail and passenger coaches, as well as box and gondola cars and cabooses.

Hoisting and Haulage Engines.—Litchfield Foundry & Machine Company, Litchfield, Ill. Catalogue No. 6. Size 6¼ x 10¼ in.; pages 32. Illustrates and describes the company's various types of first motion hoisting and haulage engines, geared hoisting engines, compound geared endless rope haulage engines, electric-driven haulage machine, tandem drum geared tail rope engine, stationary engines, auxiliary engine for steam reverse, mine ventilating fan and engine, and sheave wheels.

Drills and Saws.—Robertson Mfg. Company, Buffalo, N. Y. Pamphlet. Pertains to Robertson's 12-in. sensitive drill, 21-in. universal drill press, 24-in. sliding head drill, and Nos. 1 to 7 rapid cut power saws.

Truss Reinforcement.—American Rolling Mill Company, Middletown, Ohio, and the Truss Metal Lath Company, 147 Fourth avenue, New York City. Catalogue. Size 7½ x 9½ in.; pages 39. Describes the company's truss method of concrete reinforcement and shows buildings in which it has been applied. A report of a fire and water test made at Columbia University upon truss metal lath partitions is included.

Structural Steel.—John Eichleay, Jr., Company, South Twentieth and Wharton streets, Pittsburgh, Pa. Booklet. Size, about 4 x 6½ in.; pages 80. Includes numerous illustrations of structural work that the company is prepared to handle, and the raising, lowering, moving, shoring and underpinning of structures or heavy objects. Useful tables of dimensions, weights, capacities, &c., are given.

Dry Kilns.—American Blower Company, Detroit, Mich. Catalogue. Pages 78. Contains an interesting discussion of the theory of lumber drying and illustrates and describes the A B C moist air dry kiln and blower apparatus. It similarly deals with dry kiln specialties and gives examples of important installations. Accompanying the catalogue are two pamphlets, one devoted to blowers for mines and the other to the Scott kiln drying system.

Flexible Steel Conduit and Flexible Steel Armored Conductors.—Sprague Electric Company, New York. Pamphlet. Confined to flexible steel conduit and flexible steel armored conductors and tools and fittings used in their installation.

Automobile Parts.—High Wheel Auto Parts Company, Muncie, Ind. Booklet. Given principally to sectional views of automobile parts.

Vacuum Valves.—Norwall Mfg. Company, Chicago, Ill. Booklet. Concerns automatic air and vacuum valves, particularly adaptable for radiators.

Railroad Electrification.—General Electric Company, Schenectady, N. Y. Bulletin No. 4546. Gives detailed description of the electrification of the West Shore Railroad between Utica and Syracuse, with sectional views of power house and road bed construction.

Gears.—The Fellows Gear Shaper Company, Springfield, Vt. Booklet. Size 6 x 9 in.; pages 23. Describes in detail the construction and advantages of the Stubb tooth gear, with an increased angle of obliquity. Also contains interesting diagrams showing comparisons of maximum arc of action in various types of gears.

Feed Water Heaters.—Harrison Safety Boiler Works, Philadelphia, Pa. Pamphlet. Describes the advantages of heating boiler feed water where the main engine is run condensing, and gives illustrations of the Cochrane feed-water heater.

Friction Pulleys.—Garvin Machine Company, New York. Folder. Describes friction pulleys in detail, with illustrations.

Concentric and Inverted Diffusers.—General Electric Company, Schenectady, N. Y. Bulletin No. 4542. Describes use of diffusers on arc lights and illustrates many of their applications.

Positive Pressure Blowers.—Gilmer Crowell, 292-296 Graham street, Brooklyn, N. Y. Booklet. Pages 28. Describes and illustrates the Crowell line of positive pressure blowers and rotary compressors. Contains valuable directions as to setting up and operating, prices, &c.

Separators.—Sturtevant Mill Company, Boston, Mass. Bulletin Series 105. Explains the Newaygo separator, which was described in *The Iron Age*, October 10, 1907, and is essentially an inclined vibrating screen fed by a spiral conveyor. It is adaptable for use in cement plants, fertilizer plants, mining plants, &c.

Water Tube Boilers.—Rust Boiler Company, Pittsburgh, Pa. Bulletin. Contains report of tests on Rust boilers and a short description of the boiler construction.

High Speed Steel.—Carpenter Steel Company, Reading, Pa. Catalogue describing Zenith high speed steel and twist drills. Gives results of tests, illustrations of the company's drills, price tables and valuable hints for working tool steel. This matter is accompanied by a catalogue describing the company's automobile steels. The latter includes a table showing the elasticity of the company's steel and a description of the company's laboratory.

Electric Motors.—General Electric Company, Schenectady, N. Y. Bulletin No. 4545. Covers the product of the company's small motor department. Includes illustrations of assembling motors, sectional views and a general description.

Electric Locomotives.—General Electric Company, Schenectady, N. Y. Bulletin No. 4537. Describes a large number of present and proposed representative types of electric locomotives built by the company. Contains sketches of locomotives ranging from 17 to 150 tons for all classes of service, electrical and mechanical data and a brief preface describing the reasons for the growing demand of electric traction.

Storage Batteries.—Westinghouse Machine Company, Pittsburgh, Pa. Pertains to storage batteries for portable use and contains illustrations of storage batteries adaptable for lighting, heavy vehicle driving, automobile ignition and for switch service for lighting and power, together with tables giving dimensions, capacity and other necessary information.

Valves.—Nelson Valve Company, Philadelphia, Pa. Catalogue H. Pages 52. Contains matter relating to the company's full line of valves and fittings. The book is profusely illustrated, showing valves and unassembled parts, together with necessary descriptive matter, price-lists and dimension tables.

High Speed Saws.—United Engineering & Foundry Company, Pittsburgh, Pa. Catalogue, 21 pages. A well illustrated book, showing the company's line of hot and cold metal saws for use in rolling mills and a varied assortment of such equipment.

The Machinery Trade.

NEW YORK, April 8, 1908.

Business appears to be in a rather unsettled condition and the railroads and larger industrial companies are not inclined to come into the market for more than the few tools that are actually needed. Projected improvements of any size are also being held up, awaiting some quickening in business. As a result of the hesitancy on the part of the larger interests to come into the market there was no noticeable increase in the demand for machinery the past week, and few sales or inquiries for lots of any size were reported. Little has developed to afford much encouragement to machinery houses, and many of them are of the opinion that there will be no material increase in the demand for tools for some time. The construction of the Fourth Avenue Subway in Brooklyn will proceed rather slowly and it will be many months before the trade will derive much benefit from the purchase of machinery for that work. It is understood that the tools on the list issued in the West by the Chicago, Lake Shore & Eastern Railroad will not be purchased until summer. A refreshing feature of the trade is the manner in which the important machine tool builders of the country are maintaining prices, a large manufacturer having only last week refused to make a slight reduction to secure a good order. We are able to announce this week that two machine tool manufacturers have recently advanced prices 10 per cent.—one a manufacturer of radial drills and the other a maker of screw machines.

The season for purchasing sugar machinery for Cuba and Porto Rico is now on and the buying from those sources is sufficiently large to cause gratification among machinery men who cater to that class of trade. While there is only one large enterprise of the kind before the trade, many of the companies holding big interests on those islands are doing considerable in the way of replacing old equipment and making small additions to their plants, which has resulted in some good business for the power equipment houses, as well as those who make a specialty of sugar mill requirements. The largest sugar mill enterprise before the trade is that of the N. P. Pratt Laboratory, Atlanta, Ga., which some weeks ago secured the contract for sugar mills in Cuba which aggregate an expenditure of $1,000,000. Part of this work has been let to the Fulton Foundry & Machine Company, Atlanta, Ga., which is an operating company of the N. P. Pratt Laboratory, and other orders for necessary equipment have been placed in the trade.

The New York Central Railroad, which has for the past few months done considerable scattered buying, last week sent out inquiries for the following machine tools: One 30 in. by 14 ft. lathe, one 30 x 30 in. by 12 ft. planer, one 20-in. drill press, one 30-in. emery grinder, one motor driven bar shear, one 24-in. shaper, one bulldozer, one 42-in. vertical boring mill and one 42-in. upright drill.

The report that the Michigan Central Railroad has purchased a large tract of land at Kalamazoo, Mich., as a site for new shops is erroneous.

The Colonial Steel Company, Pittsburgh, Pa., has some inquiries in the market covering machinery equipment to be used in a new composite metal department. The requirements include rolling mill equipment, one slitting machine, two straightening machines, &c. The purchases, it is understood, will be closed very shortly, as it is the intention to get the new department in working order as soon as possible.

The International Engineering Company, Carter Building, Scranton, Pa., will shortly be ready to take up the purchase of machinery for equipping its new plant. The list of machinery required is not quite completed, but it will cover such machines as are usually installed for general boiler and engine work. The company has selected a location for its new plant and plans for the construction of the buildings will be completed shortly. The company was organized for the manufacture of traction, stationary and small locomotive engines, tubular, upright, stationary, locomotive, traction, portable boilers, general sheet iron plate and machine work, and is managed by practical mechanics and business men. H. F. Jeffrey is president; E. R. Kyler, vice-president and secretary; I. R. Miller, vice-president and consulting engineer; O. J. Hall, treasurer; F. C. D. Wilkes, mechanical engineer, and H. W. Miller, general superintendent.

The J. W. Rosenbaum Company, 239 Centre street, New York, manufacturer of art metal novelties, has purchased a plant 50 x 85 ft., two stories, in Newark, N. J., and expects to move there shortly. It is understood that before long an extensive addition will be made to the plant, and work will be begun at once on a small extension to comprise a new boiler and engine house. The amount of horsepower the company will use has not been decided as yet, but it will be purchased shortly. It is also expected that some additional new equipment will be purchased for making metal specialties in brass, iron and composition. The machinery expenditures, it is said, will amount to about $10,000.

The Frevert Machinery Company, 18 Dey street, New York, has received a nice order for machine tools from Chicago, covering some heavy lathes.

The Uncas Power Company, 49 Shetucket street, Norwich, Conn., has awarded a contract to Tucker & Vinton, 103 Park avenue, New York, for the construction of a dam and hydraulic power plant on the Shetucket River, in the town of Scotland, near Norwich. The power equipment will include three sets of duplex turbine wheels, to develop about 2500 hp. The dam will be 225 ft. long and about 70 ft. wide at the base. A transmission line will be constructed to convey the power developed from Scotland to Norwich. The buying, it is understood, will be done from the company's power office in the latter city, and it is expected that these details will be closed shortly, as it is hoped to complete the plant by fall.

McClave-Rimmer & Co., 90 West street, New York, have sold to J. Herbert Newburg, Goshen, N. Y., a Ridgway engine and dynamo to develop 140 hp.

The Public Service Commission will receive bids until May 8 for the construction of the Fourth Avenue Subway in Brooklyn, and it is probable that awards for some of the work will be made within two or three weeks after the date set for opening bids. The route for which bids will be asked extends from the Brooklyn terminal of the new Manhattan Bridge to Fourth avenue and Forty-third street, and the work is divided into six sections. Bids for each section will be received separately or a bidder may put in estimates on all of the sections, but owing to the financial condition of the city it is not likely that the contract for more than one or two of the sections will be undertaken this year. The entire cost of the six sections is estimated at $15,000,000, and the contracts to be let will cover only the construction of the subway, it being the intention to secure bids later for the equipment. Bids will also be asked for the construction of galleries along the entire roof, but they must be submitted separately from the bids for the subway work. Contractors on each section will be given two years from the date of contract in which to complete the work, and partial payments are to be made from month to month as the work progresses. Each bid must be accompanied by a certified check for $12,000 for each of the sections, except the two between Willoughby and Sackett streets, those to be accompanied by checks for $15,000 each.

The Superintendent of Public Works, Albany, N. Y., will receive bids until April 21 for making the following improvements to the Erie Canal: Contract No. 20, for dredging a channel in the Mohawk River, length 53 miles; contract No. 45, for the construction of a dam in the Oneida River at Caughdency; contract No. 64, for the improvement of the canal from the west end of contract No. 9 to 100 ft. east of Gasport Bridge.

The D. H. C. Company has been organized, with temporary offices at 27 East Twenty-seventh street, New York, to manufacture and deal in a newly patented brand of metallic packing. The company has been formed under the laws of New York State, with $200,000 capital, and the directors are Nathaniel Huggins, William B. Claflin and Edward M. Dalley. After May 15 the company will occupy offices in the Hudson Terminal Building and for the present will contract for the manufacture of its product. Later on it is expected that a plant will be built near New York.

Frank MacGovern, formerly vice-president and general manager of Rossiter-MacGovern & Co., and J. Warren Archer, formerly manager of the sales department of the same company, have organized the firm of MacGovern-Archer & Co., with offices at 114 Liberty street, New York. The new firm will deal in electrical and steam machinery, the same class of business as was carried on by the old company.

Catalogues Wanted.—The El Campo Machine Company, El Campo, Texas, incorporated with a capital stock of $10,000, will in addition to repairing gasoline engines manufacture a line of centrifugal pumps. Some additional machinery will be required for this work, and the company desires catalogues from makers of machinery for this purpose.

Chicago Machinery Market.

CHICAGO, ILL., April 7, 1908.

If there has been any increase in the machinery trade of the past week it has not been of notable extent. Manufacturers of electrical equipment, however, see in the increasing number of inquiries, coming from various power plant projects throughout the country, the promise of better business as soon as plans are more fully developed. Included in these enterprises are quite a number of municipal plants for which funds must be provided by the sale of bonds. The issues of such securities, when not too large to be taken care of locally, are readily absorbed, and the necessary funds provided without difficulty; so that the smaller plants are able to, and are, coming into the market for equipment. This

business, while entirely acceptable, is, of course, insufficient in volume to supply the manufacturing capacities, which will not be fully occupied until the larger interests begin buying more freely. Western advices indicate considerable activity in new plant construction and extensions requiring motive power and machinery equipment. These for the most part do not involve extensive requirements, but they seem to be more numerous than elsewhere.

The machine tool houses are still principally engaged on pickup orders. Aside from the recent list of tools comprised in the Chicago, Milwaukee & St. Paul requirements, recently published in these columns, there are no equipment orders of considerable size in the market. One house reports the sale of three good sized lathes within the past week; another states that its total sales for March equal those of January and February combined, while others have either held about even or made slight gains. It would seem, on the whole, therefore, that in general volume, trade is at least holding its own. While nearly all dealers have full stocks of new machines some of them are running pretty low on good second-hand tools. At least two houses have recently purchased several lots of second-hand tools to replenish their stocks. As is usually the case in times of depression buyers exhaust the possibilities of the second-hand market before turning their attention to new tools, but at the same time they are much more critical in their demands as to quality than was the case a few months ago. Dealers, therefore, find it necessary to limit their purchases of second-hand machinery to first-class tools.

Among the recent railroad purchases were a few boiler shop tools bought by the Big Four Road for installation in the Beachgrove shops at Indianapolis.

Machinery Requirements of Chicago, Lake Shore & Eastern Railroad.

The machinery houses are figuring on the following list of tools submitted last week by the Chicago, Lake Shore & Eastern Railroad, on which deliveries are required not later than July 1. It is understood that this equipment is to be installed in the new shops recently constructed by this road at Gary, Ind., for which the purchase of a considerable list of tools was made last Fall.

One 42-in. engine lathe, motor driven; one 16-in. engine lathe, motor driven; one 30 x 30 in. by 8 ft. motor driven planer, two heads; one double head bolt machine to cut bolts from ⅜ to 1½ in., with full set of dies; one 24-in. vertical drilling machine; one 66-in. radial drill, motor driven; one cylinder boring bar machine to bore cylinders from 16 in. to 32 in.; one double head punch and shears with 36-in. throat, to shear 1 x 6 in. plate and to punch 1-in. holes through 1-in. plate; one set bending rolls, 7 ft. between housings, to bend ½-in. plate; one flue welding machine; one 1½-in. Ajax bolt heading machine; one No. 6 punch and shear, to shear ¾ x 3 in. bars, with angle shear attachment to shear ⅜ x 3 x 3 in. angles; one 33-in. car wheel boring machine; one 200-ton hydraulic wheel press to press on car wheels; one single head axle lathe; two yoke riveters; one radial drill with 12-ft. arm.

Plans have been completed by the Acme Engine Company, Spokane, Wash., for large extensions to its present plant during the coming summer. The reconstructed plant will consist of a machine shop and a foundry with 600 sq. ft. of floor space, together with the addition of a large blacksmith shop. The boiler shop and pattern shop will also be enlarged, and a considerable amount of new machinery and equipment will be required for distribution through the various departments. The blacksmith shop will be supplied with drop forge hammers, power trip hammers, bolt forger, and the facilities of the boiler and pattern shop will be materially increased by the installation of new machines.

The Triumph Gear Company, Detroit, Mich., which, under the management of W. G. Morley, has for over a year been manufacturing the Triumph marine reversing gears and machine specialties, has been incorporated with a capital stock of $25,000, and has removed from Sixth and Congress streets, its former location, to 226-228 Abbott street. Additional capital and added facilities for manufacture were made necessary by the constantly increasing demand for the Triumph marine reversing gear, which constitutes the company's chief specialty. It is stated that the company will be in the market for machine tools from time to time as business demands.

The Yampa Smelting & Refining Company, Bingham, Utah, recently placed a contract with the Allis-Chalmers Company, Milwaukee, Wis., for a large equipment of machinery for converting copper matte into blister copper, consisting of two electrically operated converter stands with six 84 x 126 in. converter shells. The contract includes the furnishing of all accessories such as copper molds and cars, ladles, tamping machinery, a complete silica crushing plant for converter lining, with electric motors, and a cross compound blowing engine for furnishing the blast to the converter.

The Cutler-Hammer Mfg. Company, Milwaukee, Wis., has been awarded the contract for the electric turret-turning gear of the United States Steamship Delaware, now under construction at Newport News. This company designed and built the electric turret-turning gear installed in the port, after turret of the Indiana, the crew of which holds the world's record for marksmanship, 10 shots in two and one-half minutes, all hits.

The city of Centralia, Ill., has decided to expend $13,000 in the improvement of its waterworks system. The improvements include a new pump of 3,000,000 gal. None of the machinery or material required has yet been purchased.

Bids will be received by the city of Ligonier, Ind., until April 21, for the equipment of an electric light plant, including engine, boilers, transformers, meters and line material.

The Childress Ice & Light Company, Childress, Texas, has been incorporated with a capital stock of $40,000, and has begun the construction of a new plant, which it expects to have in operation by July 1. The equipment purchased includes a Wolfe-Linde ice machine of 25 tons daily capacity: 100-kw. Fort Wayne direct connected exciter dynamo; one 16 x 36 in. Ohio Corliss, and one 14 x 36 in. Hamilton Corliss engines, and two 150-hp. Keeler water tube boilers.

Cleveland Machinery Market.

CLEVELAND, OHIO, April 7, 1908.

The condition of the machinery market shows practically no change. Dealers continue to pick up a few scattering orders for small sized single tools, but the volume of their sales as compared with the past few weeks shows no improvement. No inquiries for a good sized order of tools are coming into the market, and none of the few of such inquiries that were received last month has resulted so far in a sale. A dealer who asked how matters stood in regard to one of the largest of these inquiries received word a few days ago that it had been decided to postpone indefinitely the proposd purchase of several thousand dollars' worth of machinery and machine tool equipment.

Machine tool builders report no improvement in their domestic orders, but some concerns that have a foreign trade report a better foreign demand for their products, and orders that they have taken for export during the past few weeks have enabled them to increase considerably the capacity at which their plants have been operated. While builders of heavy power machinery have nothing to report in the way of sales, they report some improvement in inquiries in this territory and expect some fairly good orders to be placed within the next few weeks. A more hopeful feeling seems to prevail among manufacturers, but general conditions among concerns engaged in the metal trades are far from uniform. Some plants no longer feel the effects of the depression and are running at practically full capacity, while others are running on half time or less, with no increase of orders over the first of the year. The local automobile industry is looking fairly good at present. Some good orders have come in and at least two plants are running at about full capacity. Engineering firms report considerable improvement in the outlook for construction work in some lines, but little work is in sight in the way of designing and erecting industrial plants.

The general financial situation is still far from satisfactory. Collections are quite bad and prospective borrowers complain that banks are asking too high rates of interest for loans. The hesitancy of buyers of machinery and tools to place orders for plant additions and improvements is attributed partly to the condition of the money market.

A large number of second-hand tools are now being offered to dealers, but the demand is limited and dealers are slow in stocking up with used tools.

Jobbing foundries report some improvement in the demand for light castings and local plants are being operated at an average of about 50 per cent. The demand for heavy castings, however, is very light, and there is more price cutting among makers of heavy castings than among foundries that make light castings.

The Union Steel Screw Company, Cleveland, reports considerable improvement in orders and is in receipt of encouraging reports from its traveling men in the West and Southeast. The company is now operating its plant with full force 40 hr. per week.

The Bronson-Walton Company, Cleveland, maker of steel hollow ware, has increased its capital stock from $100,000 to $200,000, to provide more working capital for the extension of the business. No additions to the plant are contemplated for the present.

The Packard Electric Company, Warren, Ohio, has closed a contract for the erection of a new plant. The building will be of brick, 48 x 84 ft. and two stories high.

Reports from Niles, Ohio, state that the Standard Electric Company of that city has practically decided to build a large factory for the manufacture of Tungsten lamps.

The Osborn Engineering Company, Cleveland, has awarded the following contracts for the foundry equipment for the new plant of the Bay View Foundry Company, Sandusky,

Ohio: Cupola, crane, hoist and tumbling barrels to the Northern Engineering Works, Detroit; generator, Westinghouse Electric & Mfg. Company, Pittsburgh; compressor, Bury Compressor Company, Erie, Pa.; blower, grinder and other equipment, Central Foundry & Supply Company, Columbus, Ohio.

The directors of the American Roll & Foundry Company, Canton, Ohio, have called a meeting of the stockholders for April 30 to take action on a proposed increase of the capital stock from $200,000 to $300,000.

The Royal Foundry & Machine Company, Canton, Ohio, has been incorporated, with a capital stock of $15,000, by Paul Browsky, W. J. Putnam, G. P. Browsky, George F. Edel and A. P. Mouer.

The American Case & Register Company will erect a large plant at Salem, Ohio. One of the building contracts has been closed and the work will be started at once.

George B. Dusinberre, 517 Electric Building, Cleveland, Ohio, has been appointed representative of the Duplex Metals Company, New York, for the sale of Monnot copper clad wire and other products. Mr. Dusinberre's territory will be the States of Ohio, Indiana and Michigan. In addition to the already large demand for this wire for telephone and kindred uses, there is a growing appreciation of its value for many mechanical applications where the strength of the steel with the protective qualities of the welded copper covering are desirable.

Cincinnati Machinery Market.

CINCINNATI, OHIO, April 7, 1908.

Intermittent buying, and in lots of from two and three to a dozen or more tools, has marked the flight of the week, and the charge of total or even partial stagnation of business in this market which discouraged ones affected to foresee for the second quarter is refuted by the records. The lathe makers, who for some time have admittedly seen and experienced the limit of buying inactivity, now forge to the head of the column, for lathes have undoubtedly been most active the past week, with milling machines and shapers a close second.

There is a better feeling among manufacturers of all standard tools and the tone is more healthy. One manufacturer of lathes quoted on 10 distinct inquiries in Saturday morning's mail. The disposition to drive for bargains, to court extra discounts so characteristic of the earlier year, seems to be relaxing, and buyers and sellers are gradually closing up the gap. One of the largest concerns making a specialty of lathes sold during the week the best bill of tools handled by the organization since the beginning of the slump in October, the aggregate of sales of the week looking for the first time like a normal week of middle 1907. All this business was domestic and about evenly divided between direct and agency, one order being the outcome of an inquiry six weeks old and all of it having its origin during the new year. The major part of inquiries now being received are domestic, there being comparatively little from Europe.

Tool manufacturers are still running on short time, ranging from 30 to 44 hr., and with reduced forces. Jobbing foundries see little change for the better, although they anticipate some castings contracts soon because of the improvement shown in the demand for tools, which must soon develop into buying.

Considerable local interest is manifest in the awakening and investment of capital in steelmaking establishments, two of which in this territory are the new Andrews steel plant in Newport and the old Ashland sheet mill at Ashland, Ky. The taking off of the first successful heat in the former occurred on Saturday morning. For the present sheet bars will be the product, the full capacity being engaged gradually and as the demand warrants. The greater part of this output will be taken by the Newport Rolling Mills, an affiliated concern, whose stocks of sheet bars have been allowed to run low in anticipation of the new source of supply.

The old Ashland sheet mill at Ashland has been taken over, with privilege of purchase, by E. J. Job of Niles, Ohio, and workmen have commenced to clean up the plant preparatory to starting operations about the middle of the month. This is a six-mill plant. The new organization will be known as the Job Iron & Steel Company and will be capitalized for $200,000.

Through a little real estate transaction by which the Lodge & Shipley Machine Tool Company of this city acquires a leasehold on some property adjoining the plant on the north side, it has been erroneously reported that the company would build an addition to its plant. The property was leased simply to give an easement and to avoid the necessity of building an expensive wall.

Bernard Schaefer, proprietor of the Cincinnati Artistic Wrought Iron Works, 2736 and 2738 Colerain avenue, has found his present quarters inadequate and has acquired the property at 2941 and 2943 Eastern avenue, with three-story brick buildings on a lot 60 x 100 ft., and will immediately put them in order to accommodate the machinery and appliances of his plant.

The Cincinnati Chuck Company is now fully installed in its new quarters at Spring Grove avenue and Sassafras street and is running full time, 55 hr., with a full force making up stock. This company will eventually build several different types and style of chucks.

The J. M. Robinson Mfg. Company, Spring Grove avenue, maker of presses, forming tools, cornice brakes, shears and special machinery for sheet metal workers, is for the first time in many months engaged on machinery for stock, its bookings of special machinery having made stock work impracticable for several years. The die department is the busiest in the establishment. This is the company which is building large rolls for West Virginia parties.

Some changes are pending in the official management of the Elmwood Castings Company, an enterprise about a year old, in which the Staceys of the Stacey Mfg. Company are largely interested. The directors have accepted the resignation of S. W. Spear, who was recently elected vice-president and general manager. Mr. Spear will remain here for the present and is undecided as to his future plans.

At the plant of the Cincinnati Horse Shoe & Iron Company a full force, averaging about 100 men, is working full time, and the capacity is at the present time about 360 kegs a day. The company has confined its market to the Central States so far, but will eventually extend its lines to take in other boundaries. Inadvertently the name of the old general manager, William Eynon, was used in last week's reference in this correspondence to pending matters of the company. The general direction of the business is in the hands of the Executive Committee, of which Henry R. Meyers is chairman. Secretary and Treasurer Walter C. Renaker is in charge of the city offices and sales departments.

An interesting visitor of the past week was Y. Kamimura, a lieutenant in the Imperial Japanese Navy. The visitor was looking over the machinery field. He spent some time at the plant of the Niles Tool Works Company in Hamilton.

Following closely upon the annual meeting and convention in New York of the National Metal Trades Association, whose general offices and executive heads are here, comes the official announcement from the University of Cincinnati of inauguration of the test and research laboratories by the College of Engineering department of that institution. The plan has been outlined before in *The Iron Age* and is reasonably familiar to the machine tool manufacturing world. Says the circular in part: "The completion of the new annex to the College of Engineering has enabled us to install our testing machinery, so as to make it available for a more extended use. Additional machinery has been purchased, so that the physical test of various materials may be accurately and quickly made. The research laboratories in physics and chemistry have also been equipped to meet any general demands for physical and chemical testing or research." The university invites manufacturers to bring to the heads of the scientific departments any problems which may need expert attention or the expert use of the machines. The university will do testing in all departments, but not to compete with any commercial testing that is done in the city.

The Vulcan Iron Works Company, Toledo, Ohio, is reported to have increased its capital stock from $75,000 to $525,000. This company recently erected a large plant on Dorr street, in that city, for the manufacture of steam shovels.

W. P. Deppe, vice-president and general manager of the Mabou & Gulf Coal Company, Ltd., Mabou, Cape Breton, N. S., has been in this section a week or so buying locomotives, cars and other equipment for his company. He is a former official of the Big Four Railroad.

The industrial situation in Dayton, Ohio, has improved materially within the past week. The National Cash Register Company, which was closed down for a time, is again in operation, with a force of 3000, a trifle over half the normal. President F. T. Huffman of the Davis Sewing Machine Company reports that 1700 people are now employed at that plant and that order books are in good shape. Secretary Joseph F. Campbell of the Dayton Motor Car Company, maker of the Stoddard automobile, states that 1050 men are now on the pay roll at that institution, the largest force it has ever had, with orders enough to warrant a steady run for three months. The Computing Scale Company reports business improving and that it is running a full force. O. O. Ozias of that company, who has recently been abroad, brought back some good orders and is quite well pleased with the outlook in that branch of the business. Vice-President E. F. Platt of the Platt Iron Works talks encouragingly of the future and says that his company is working 400 men, with prospects for more soon.

New England Machinery Market.

WORCESTER, MASS., April 7, 1908.

Business conditions are changing very little, this statement applying equally well to manufacturers and dealers. A few machines are being sold, but inquiries continue numerous. Such orders as are received are small. In general

manufacturing a slight improvement is noted in individual cases, and perhaps the total volume of orders is greater. There is said to be a very slight improvement in the demand for textile machinery.

The great hardware industries of New Britain are feeling more encouraged as to the immediate future of their business. In certain instances, notably the Stanley Rule & Level Company, business is not so far below the normal level as is the common experience, production equaling that of three years ago, though materially below the high level mark of the past two years. The experience of the great branches of the American Hardware Corporation, including P. & F. Corbin, Russell & Irwin Mfg. Company and the Corbin Screw Corporation, is that reports received from representatives and connections all over the country agree as to numerous inquiries and indications of activity, but without materialization into orders. These large manufacturers are doing little buying themselves, pursuing a hand to mouth policy in this respect.

In connection with the assignment of the Thornton Machinery Company, Providence, R. I., dealer in machine tools and textile machinery, it is stated in the local press that it is not planned to resume the business.

The plant of the Agnew Auto Mailing Machine Company, Boston, Mass., sold at auction, last week, was bid in by parties interested in reorganizing the business, and consequently the machinery not already sold will not come on the market for the present.

A slight increase is noted in the amount of work which the railroad repair shops are doing. Announcement of a material increase in working force and hours at the Concord shops of the Boston & Maine Railroad is the most encouraging indication of this character. It is unofficially stated that the New York, New Haven & Hartford Railroad will not insist upon the adoption of the piece work system in its shops, the announcement of which threatened to result in serious labor troubles. But it is believed that when men are taken back after the layoff now in progress many of them will accept the new piece work system, precedent for which already exists in these shops.

The Worcester Pressed Steel Company, Worcester, Mass., is to build an addition to its plant this spring to be 30 x 60 ft., one story. It will be devoted to annealing and case hardening. The company will be in the market for a large annealing furnace for the building. The rolling mill equipment, which had been planned for last year, will be installed this season, and the company would like to receive quotations on this class of machinery. The specifications call for a mill to roll steel up to 16 in. wide, no thinner than 0.015 and up to 0.250 in. The Gem Mfg. Company, Everett, Mass., has recently been acquired by George F. Higgins, Worcester, and interests identified with the Worcester Pressed Steel Company, and the two plants will be operated in co-operation, though they are entirely independent concerns. The Worcester factory will devote its energies to heavy, deep drawing, while the Everett plant will handle lighter and larger work exclusively, including a number of specialties. Mr. Higgins is manager of the newly acquired business.

Charles H. Norton of the Norton Grinding Company, Worcester, Mass., who has just returned from a business trip to England, Scotland and Germany, states that Germany seems to have recovered from the sharpest of its business depression, but that manufacturing business in Great Britain has fallen flat in the past few weeks. Everywhere he went in England and Scotland business men laid the blame of their slackened conditions to the United States.

The New Departure Mfg. Company, Bristol, Conn., manufacturer of automobile and bicycle sundries and other metal specialties, will at once complete the large additions to its plant, consisting of a three-story building 40 x 70 ft.; steel ball hardening shop, 40 x 50 ft., and a new engine room, 30 x 40 ft. The two first named buildings will be used exclusively for the manufacture of the company's annular ball bearings.

The Norton Grinding Company, Worcester, Mass., is building on order a cylindrical grinding machine which will take work 16 ft. long and 20 in. in diameter. Its purpose is to grind steel shafts weighing 9000 lb.

The Taylor & Fenn Company, Hartford, Conn., has added to its line of machinery a new automatic screw slotter.

The Walter H. Baker Company, Boston, is finishing up its new machine shop and is buying a few tools to complete its equipment.

The Royal Motor Works, Inc., Worcester, Mass., has started the manufacture of a new motor cycle. C. A. Persons is the president and treasurer of the company, and Eveleth Hill is the works manager.

The Powell Tool Company, Worcester, Mass., of which A. M. Powell is the head, has completed the equipment of its shop and has begun the manufacture of the first planer of a new type which will be a special feature of the company's line. It will be known as the accelerating cut planer, with increase of speed in the cut rather than in the return, and is designed to plane long forged pieces. A special mechanism, patents on which are now pending, provides the accelerating feature of the tool. This machine will be in addition to a standard type of high speed planer. The first machine will be a 24-in., and is intended for demonstrating the new idea in planer practice.

The new hydraulic electrical plant which the Barre Wool Combing Company, Barre, Mass., will establish in that town, will be equipped to generate 320 hp.

Philadelphia Machinery Market.

PHILADELPHIA, PA., April 7, 1908.

The month of March, which is usually a pretty satisfactory one in the machinery trade, showed less activity than was generally expected, and in some instances the volume of business placed fell below that for the previous month. While sales in the past week show a continuance of the dull conditions which have characterized the market for some time, a little better inquiry has developed, so that the trade is inclined to feel more hopeful. There should be an improvement, under ordinary circumstances, during the spring months, although no great volume of new business is anticipated. Railroad buying is at a standstill, the local roads showing no inclination to come into the market, but some inquiry is expected to develop from one of the roads in the northern part of the State in the near future.

The placing of some small orders with the carbuilders imparts encouragement to the situation, although as far as the local roads are concerned, a very large number of idle locomotives and cars are on their tracks, and work at these companies' shops has been pared down to the minimum.

The demand is still confined closely to single tool propositions. One exception was to be noted, however, when bids were asked on quite a good line of general shop equipment. This matter is still in a somewhat indefinite state, and until approximate costs of the equipment are known it will be uncertain as to whether the order will be placed or held up for the time. Some few special tools have been sold, but there has been nothing done in the way of the larger standard tools.

Makers of specialties seem to have picked up a little more business, but plants are seldom running over from 40 to 50 per cent. of their capacity. Manufacturers of large power equipment report a better inquiry, and some business is expected shortly to develop in this line.

The demand for second-hand machinery holds up quite well. Dealers report a fair volume of business on certain classes of tools, mostly of the smaller sizes. Prospective buyers are looking the second-hand machinery market over pretty fully before placing orders, and frequently find tools which meet their requirements at costs considerably below that of new equipment. Machinery merchants in some cases have been doing considerable business in second-hand tools.

The demand for both iron and steel castings continues slow, and foundries show but little improvement; in fact, in some instances a further recession of business is reported. Buyers of castings place orders sufficient for their immediate needs only. Tool builders' requirements are not very urgent, while the building trades show but little of the expected spring activity. Foundries are operating irregularly, dependent to a great extent on daily orders, there being practically no contract business around, and specifications are very light on such business already in hand.

The Schuylkill Navigation Company, 420 Ternimal Building, has commissioned J. W. Ledoux to prepare plans for a waterpower plant, to be built at a point along the line of the Pennsylvania Railroad. The plans will provide for a brick and concrete structure 70 x 140 ft.

A charter has recently been granted the Philadelphia Terminal Transfer Company, of which E. B. Colket is president, to build a connecting railroad, tapping the various railroads entering the city as well as the suburban electric lines. The road is to carry freight, and to be established in connection with the Philadelphia & Western Traction Company and the Philadelphia & Western Railway. While no authoritative statements will be given out at present, it is understood that the route will begin near Lafayette Station on the Philadelphia & Reading, 11 miles from Philadelphia, on the Schuylkill River, and extend southward to the Delaware River at a point near Essington. Surveys are now being made, and considerable property for terminal stations has, it is said, been purchased.

It is now reported that the plans of the Susquehanna Power Company, which proposes to erect a large dam and power plant near Conowingo, Md., and build a canal along the Susquehanna River from Port Deposit, Md., to Columbia, Pa., are likely to be consummated. Legislation regarding this project will probably be passed at an early date, and it is expected that plans for the work will be made directly thereafter. The cost of this enterprise is estimated at $18,000,000.

The American Pulley Company reports only a fair volume of new business during the past month. The foreign demand is not much more than holding its own, while domestic trade in the East and West has been inactive. More

business has developed, however, in the Southern territory. Orders for export recently have been confined to the European countries, and shipments, while fairly good, are not very large individually. The plant of this concern continues to operate at about 60 per cent. of its normal capacity.

The Philadelphia Roll & Machine Company reports an improvement in the demand for both sand and chilled charcoal iron rolls. Orders have been somewhat scattered, but are of sufficient volume in the aggregate to keep the plant running from four to five days per week.

Government Purchases.

WASHINGTON, D. C., April 7, 1908.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 21 for three steel pressure blowers, one guillotine shear, one tumbling barrel; and until April 28 for one milling machine, one centrifugal pump and one turbine pump, for the Eastern navy yards.

The Isthmian Canal Commission will shortly ask bids for one 18-in. engine lathe, one 9-in. bench lathe, one 3½-in. bolt cutter, one 36-in. upright drill, one 24-in. shaper, one 26-in. emery grinder, and other shop equipment.

The following bids were opened March 31 for machinery for the navy yards:

Class 61.—One set standard plate bending rolls—Bidder 13, Bethlehem Steel Company, South Bethlehem, Pa., $1500; 17, Bertsch & Co., Cambridge City, Ind., $1212; 28, Baird Machinery Company, Pittsburgh, Pa., $940; 49, Cleveland Punch & Shear Works, Cleveland, Ohio, $1275; 65, Drew Machinery Agency, Manchester, N. H., $1076; 73, Frevert Machinery Company, New York, $1298; 77, Fairbanks Company, New York, $997.77; 95, Hilles & Jones Company, Wilmington, Del., $1124; 153, Niles-Bement-Pond Company, New York, $1200; 161, Prentiss Tool & Supply Company, New York, $1295; 183, Sculley Steel & Iron Company, Chicago, Ill., $1233; 221, Wickes Bros., Saginaw, Mich., $985.57.

Class 62.—One combination grinding machine—Bidder 71, W. H. Foster Company, New York, $3200; 73, Frevert Machinery Company, New York, $2975; 161, Prentiss Tool & Supply Company, New York, $2895; 205, Tindel-Morris Company, Eddystone, Pa., $2550.

Class 108.—One portable electric grinder—Bidder 47, Cincinnati Electrical Tool Company, Cincinnati, Ohio, $43.34; 50, Chicago Pneumatic Tool Company, New York, $55; 73, Frevert Machinery Company, New York, $60 and $56; 76, Fairbanks Company, New York, $65; 83, R. W. Geldart, New York, $65; 89, Hisey-Wolff Machine Company, Cincinnati, Ohio, $65; 127, Manning, Maxwell & Moore, New York, $65; 139, Manhattan Supply Company, New York, $65; 152, National Electrical Supply Company, Washington, D. C., $59; 159, S. M. Price Machinery Company, Norfolk, Va., $56; 161, Prentiss Tool & Supply Company, New York, $59; 173, J. B. Roach, Brooklyn, N. Y., $65; 178, Sherman, Brown, Clements Company, New York, $65; 211, Tucker Tool & Machine Company, New York, $65; 232, Excelsior Equipment Company, Pittsburgh, Pa., $65.

Class 111.—One portable boring bar—Bidder 214, H. B. Underwood & Co., Philadelphia, Pa., $660.

Class 141.—Four ammunition hoist motors—Bidder 85, General Electric Company, Schenectady, N. Y., $2400.

Class 142.—Fourteen semi-inclosed variable speed motors—Bidder 53, Cushman Electric Company, Concord, N. H., $5895; 68, Electro Dynamic Company, Bayonne, N. J., $6581; 85, General Electric Company, Schenectady, N. Y., $6399; 139, Manhattan Supply Company, New York, $8560; 150, Northern Electric Mfg. Company, Madison, Wis., $5816.53 and $5916.53; 175, Roth Bros. & Co., Chicago, Ill., $8152 and $7939; 227, Western Electric Company, New York, $7939.95; 230, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., $6805.15.

Class 181.—One turbine blower—Bidder 43, Conveying Machinery Company, New York, $2085 and $1300; 61, Dravo, Doyle & Co., Philadelphia, Pa., $1505; 199, Sirocco Engineering Company, New York, $1556; 217, Vermilye & Power, New York, $1505.

The following bids were opened March 30, circular No. 429, for rock drills, &c., for the Isthmian Canal Commission:

Class 1.—Twenty-five rock drills and spare parts—Bidder 23, Chicago Pneumatic Tool Company, New York, $7529.25; 53, Ingersoll-Rand Company, New York, $8316.14; 54, International Electric & Engineering Company, New York, $6859; 109, Sullivan Machinery Company, Chicago, Ill., $8316.14.

The following bids were opened March 28 for two boilers, &c., for the Bremerton navy yard:

Hallidie Machinery Company, Seattle, Wash., $37,400 for work complete. Babcock & Wilcox Company, Philadelphia, Pa., $30,001 for B. & W. boilers; $33,757 with Foster superheaters; deduct $2322 for substituting Weber steel concrete stack; $33,330 for B. & W. boilers, steel stack and flue with Foster standard superheaters; add $3322 for submitting Weber steel concrete chimney; deduct $613 for substituting B. & W. standard superheaters; $33,000 for Sterling boilers, steel stack and flue and Foster special superheaters; deduct $2322 for substituting Weber steel concrete chimney; deduct $427 for substituting Foster standard superheater; deduct $613 for substituting Sterling standard superheater. Risdon Iron & Locomotive Works, San Francisco, Cal., for two boilers, superheaters, piping stack and flue with enlarged stack base, $41,600; without enlarged base, $40,900; if grates are reduced 86½ sq. ft., deduct $100; for No. 18 copper Astragel to stack, add $500; if boilers are supported on front and rear walls, deduct $600. Elliott Bay Iron Works, Seattle, Wash., work complete, $38,935; if asbestos molded block is used for flue covering instead of 85 per cent. magnesia, deduct $900; if flue covering is omitted entirely, deduct $3000.

The Pusey & Jones Company, Wilmington, Del., has been awarded contract for one 125-hp. boiler for the Key West Barracks, Fla., at $2900.

The following awards have been made by the commanding officer of Augusta Arsenal, Ga., under opening of February 26 for machinery:

Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., item 2, two motor generator sets, $819.12 each; item 3, one 25-hp. induction motor, $317.54; item 4, one 15-hp. induction motor, $373.39; item 5, one 15-hp. direct current motor, $488.04; item 6, one 10-hp. direct current motor, $324.28; item 7, three 5-hp. induction motors, $119 each; item 8, one 2-hp. induction motor, $65.95.

Lincoln Motor Works Company, Cleveland, Ohio, item 9, one 5-hp. motor and drive for lathe, $545; item 10, one 3-hp. motor and drive for lathe, $410.

General Electric Company, Schenectady, N. Y., item 11, portable testing instruments, $270.

Maris Bros., Philadelphia, Pa., item 12, one 5-ton 2-motor crane, $1850; item 13, one 5-ton 2-motor crane, $1340.

Newton Machine Tool Works, Philadelphia, Pa., item 36, one cold saw cutting-off machine, $1098.

Cotton States Belting & Supply Company, Atlanta, Ga., item 37, one plain milling machine, $1950; item 38, one hand milling machine, $240; item 50, one rapid reduction lathe, $2270; item 54, one tool grinding machine, $280.

Niles-Bement-Pond Company, New York, item 38, one horizontal boring and drilling machine, $3148; item 40, one 5-ft. radial drill, $1545; item 41, one 15-in. crank slotting machine, $1975; item 42, one 13-in. sensitive drill press, $47; item 59, one 1100-lb. pneumatic hammer, $1065.

Pratt & Whitney Company, Hartford, Conn., item 45, one 10-in. toolmakers' lathe, $680; item 49, one 15-in. engine lathe, $1717.

Jones & Lamson Machine Company, Springfield, Vt., item 46, one turret lathe, $1605.

Manning, Maxwell & Moore, New York, item 43, one hand screw machine, $789; item 57, one bolt header, $39; item 66, one planing, matching and surfacing machine, $644.

Brown & Sharpe Mfg. Company, Providence, R. I., item 51, one universal grinding machine, $949.

Baird Machinery Company, Pittsburgh, Pa., item 55, tinsmith's shears, $62.

Independent Pneumatic Tool Company, Chicago, Ill., item 56, one portable pneumatic hammer, $61.50.

Riehle Brothers, New York, item 60, 50,000-lb. testing machine, $1015.

Oliver Machinery Company, New York, item 61, one wood mortising machine, $1290; item 65, one dimension wood planer, $2200.

Atlantic Works, Philadelphia, Pa., item 67, one band saw, $325.

The following awards have been made for machinery for the navy yards, bids for which were opened March 3:

American Wood Working Machinery Company, New York, class 31, one timber planer, $2866.40.

William R. Mershon, Saginaw, Mich., class 32, one combination hand resaw and rip saw, $1314.94.

Under opening of March 24, for machinery for the navy yards, J. B. Roach, Brooklyn, N. Y., has been awarded class 136, six hydraulic jacks, $253.20.

Cumulative Voting for New York Corporations.

A correspondent calls attention to the fact that a bill is now pending in the New York Legislature which is meeting with strong objection from many corporations. He says:

Assembly Bill No. 1665, now in the hands of the Assembly Committee on the Judiciary, aims to amend the general corporation law of New York in a way which should secure the attention of every corporation affected. The amendment states that, unless the certificate of incorporation provides otherwise, each stockholder shall be entitled to as many votes as shall equal the number of his shares of stock multiplied by the number of directors to be elected, and that he may cast all of such votes for a single director or may distribute them among the number to be voted for, or any two or more of them, as he may see fit; which right, when exercised, shall be termed cumulative voting.

Under the existing law, there must be a provision in the certificate of incorporation to entitle stockholders to this right. If this amendment becomes a law, it will seriously affect many corporations, and will give unusual power to the minority stockholders. Cumulative voting is designed to give the minority stockholders the right to representation on the Board of Directors, but, inasmuch as it is common usage for the majority interest to control the policy of a business, the new method would undoubtedly lead to considerable friction, and would even make it possible for the minority interest to elect a majority of the Board of Directors.

If a corporation had 2000 shares of stock, with five directors to be elected, the amended law would permit 10,000 votes to be cast. If the majority interests controlled 1200 shares, they would cast the votes equally for the five directors, each director receiving 1200 votes. The minority stockholders would control 800 shares, giving them the right to cast 4000 votes. If they divide these among three persons, each receiving 1333 votes, they will elect three out of the five directors to be chosen. The amendment is regarded as objectionable for these reasons.

Our correspondent evidently assumes that the majority interests in corporations arrogate the right to themselves to elect every member of the Board of Directors. If, owning a bare majority of the stock, they were to proceed on this plan of operations, with a cumulative law in effect, they would certainly run the risk of being ousted by the minority. The proposed cumulative method of voting, however, would not prevent the majority interests from retaining the control of the board if they forestalled the minority by themselves using that method in casting their votes.

HARDWARE

MANY Hardware and other manufacturers in their effort to keep prices steady and prevent a demoralized market are seriously embarrassed by the so-called anti-trust laws now in force. Under the terms of these laws and the construction properly given them by the courts, any agreements or understandings which aim at the control of prices or the limiting of production are in restraint of trade, and the parties entering into such agreements are liable to heavy penalties. While these laws were enacted with the laudable purpose of curbing mischievous combinations they have the effect of making illegal agreements and understandings between manufacturers and merchants which are reasonable, and indeed necessary unless there is to be absolutely uncontrolled competition with the multitude of evils that follow in its train. The American Hardware Manufacturers' Association has put itself on record as favoring a modification of the law so that it would prevent only unreasonable restraint of trade. A similar position has been taken by the representatives of nearly every branch of business, indicating the general recognition of the necessity for revision of the laws in question. It is certainly to be hoped that this matter will not escape the attention of Congress and that the changes called for may be made. This is a subject on which it would be in order for those interested to communicate with their Senators and Representatives.

One of the latest bills for the benefit of the residents on the rural routes is referred to in our Washington letter in this issue. While the proposed bill incorporates a provision for a parcel post on such routes, this part of the service which it would secure is entirely subordinate to the more dignified work of transporting passengers in a thoroughly modern and up to date manner. The project is for nothing less than an Auto-Post-Coach Service which will carry passengers, baggage, mail and general merchandise. Everything connected with this service is to correspond with its high sounding title. The automobiles or post coaches are to be sufficiently capacious to carry 10 passengers and nearly a ton of baggage or merchandise. They are not to run on common country roads, but on macadamized and well kept highways, along which are to be erected post cabins, which appear to be stations for the shelter of the public and to facilitate the collection and delivery of baggage and merchandise. For all this style and comfort the charges can scarcely be characterized as exorbitant: Adults are carried over the route, whether its length be 10 miles or 30 miles, for 10 cents, while, presumably to encourage education and at the same time curry favor with the boys and girls, school children will be permitted to make the round trip for 5 cents.

It is not, however, to be supposed that the carriage of parcels and merchandise of considerable bulk is overlooked. The dominant idea in the plan is evidently the carrying of persons, and when it comes to describing the packages that may be transported, the law finding it difficult to break away entirely from the human side of enterprise, makes the fundamental standard of size the dress suit case, which is, however, supplemented by peach baskets and barrels. The price, too, for conveying merchandise is deserving of attention: A package one-eighth of the size of a suit case, 3 x 6 x 12 in., no matter what its weight, is to be carried for 1 cent. In the presence of such a project which aims to confer such benefits on the rural communities it would be ungracious and impertinent to attempt to figure the cost of installing and maintaining this auto post coach service, which, it is safe to say, would hold an absolutely unique position in the administration of the postal departments of the world. Is this postal progress gone mad, or is some one poking fun at the impracticable schemes before Congress?

Condition of Trade.

There is little change to report in the main features of the situation, conditions being substantially the same as referred to in the last review of the market as given in these columns and in the special letters from representative jobbing houses in the principal trade centers. The advance of the season brings with it naturally increased activity in summer goods and at the same time the prevalence of fine weather has a stimulating effect on business generally. There is, perhaps, on the whole, a more liberal movement of merchandise, giving the railroads more to do and helping to put them in a position to make repairs and betterments which they have as much as possible been deferring. The reports in regard to the crops, too, are decidedly encouraging and the prospects for a good yield so far as it can be estimated at this early date are excellent. The gradual clearing of the financial skies and the return to normal conditions tends to restore public confidence, especially when taken in connection with the comparatively few failures in commercial and manufacturing circles. The extent to which values are maintained in Iron and Hardware products is giving the merchants and manufacturers an opportunity to dispose of their stocks of high priced material or goods and justifies them in covering their early requirements. In this condition of things there still continues to be conservative buying, care being exercised not to purchase in larger quantities than the business in sight seems to call for. The trade are regarding with interest and appreciation the efforts which are being made by so many manufacturers, including the largest producers of the cruder products, to maintain prices, and confidence is thus inspired, that even if a readjustment should be deemed advisable or be forced upon them by the exigencies of trade a conservative policy would still be pursued, mitigating the severity of unrestrained competition and keeping the market from going utterly to pieces. A good many changes are taking place in the price of products in the Hardware and closely related lines, most of them being reductions, but here and there advances are announced. It is a trying time for combinations—if the understandings between the manufacturers may be designated by this term which is outlawed under existing statutes—and some lines of goods which have been characterized by a good deal of regularity in price are selling at materially lower prices. Where manufacturers have quantity discounts there is a tendency in view of the limited volume of trade to reduce the quantities so as to put them within the reach of a greater number of houses. Another effect of a manufacturing capacity which is in excess of demand is to induce manufacturers to accept orders from smaller merchants more freely than has

been the case heretofore, and in some important lines where a differential is theoretically made between the jobbing and the retail trade it is easier for the latter to purchase at prices which closely approximate those established for the wholesale houses if not at practically identical prices. In this way the present situation militates somewhat against the jobbers, but on the other hand the disposition of retail merchants to buy more frequently and in smaller quantities than usual is decidedly in their favor, and on the whole they are unquestionably holding their own admirably as the great distributors of Hardware and allied goods.

Chicago.

The chill winds and frosty weather that have marked the opening days of April have had a retarding influence upon trade, which has been the more noticeable because of the prevailing practice of buying only for actual needs as they develop from time to time. It naturally follows under such circumstances that fluctuations in the general consumptive demand are quickly reflected in the rising and falling volume of orders coming from the retail dealers who, as a rule, are trimming their stocks as closely as possible to present rather than prospective requirements. It is encouraging to find some improvement in March over the preceding month, even if somewhat disappointing in extent, and it is hoped that the showing for April will prove not only relatively but positively stronger. The volume of business in Wire and Nails, while still of fair proportions, has not increased much of late, but when outdoor building construction of all kinds is fully under way in all sections of the country and the stocks in dealers' and jobbers' hands begin to move more freely there should be enough business coming out to keep the mills comfortably employed on these products. Owing to the prolongation of the closed season for game in several of the Western States the movement of Hunting and Fishing goods is somewhat retarded, and in some sections will delay active trade in these lines for 30 days beyond the usual season. The demand for Baseball goods bids fair to be exceptionally good and will develop rapidly with the entrance of settled spring weather. Building permits issued in Chicago for the month of March show a decline in cost of a little more than 18 per cent. over the corresponding month of last year, but record an increase in the number of buildings of about 10 per cent. This means the construction of more small buildings, such as apartments, dwellings and small factory plants, which will call for builders' Hardware of the commoner grades. The few building projects involving estimates of considerable size for builders' Hardware are attracting vigorous competition from manufacturers, to whom such orders are particularly desirable at the present time.

NOTES ON PRICES.

Wire Nails.—Market conditions have shown little change during the week. The demand is continuous, but for conservative quantities, and not infrequently orders to mills are accompanied by requests for prompt shipment. This is the result of the course which buyers have pursued for the past six months of purchasing only enough to cover near-by requirements. The action has prevented accumulation of stocks, and mills are able to make prompt shipments. Under trade conditions now ruling the difference in price to wholesale and retail carload buyers is not always enforced. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots to retail merchants	2.10

New York.—Buyers are purchasing in small quantities, and only for immediate requirements. Regular quotations are on the basis of $2.40 per keg for small lots at store.

Chicago.—New business is coming out in fair volume and there is no halt in the steady forwarding of shipments. The promptness with which the mills are able to execute orders precludes the necessity of anticipating wants far in advance, and the result is that buyers are far more conservative in their purchases than was the case last year. While jobbers' stocks are as a rule adequate to the demand they are by no means large, and their steady movement will mean continued replenishment. Prices are reported to be unwaveringly held at established prices. Quotations are as follows: $2.23 in car lots to jobbers, and $2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—New orders for Wire Nails being placed with the mills are fairly large, but the trade is restricting purchases largely to near-by requirements, as buyers see no necessity for anticipating purchases. There is no early probability of a change in prices, and the mills are able to make prompt deliveries. A notable feature of the Wire Nail trade is that new orders are almost invariably accompanied with the request for prompt shipment, showing that stocks in merchants' hands are very much lighter than usual at this season of the year. The mills are absolutely maintaining prices, but in some cases jobbers are offering slight concessions on Wire Nails, when sold with other Hardware products. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots to retail merchants	2.10

Cut Nails.—Manufacturers are still hopeful that demand will show improvement in the future, although there are no indications of change in this respect at present. Mills are still restricting output to correspond as nearly as possible to the requirements of the trade. Concessions are being made on regular Steel Nail quotations, which are as follows: $2.05 base, per keg for carload lots at mill. Iron Nails generally should command about 10 cents more than Steel.

New York.—The demand for Cut Nails in the local market is comparatively light. Regular quotations are on the basis of $2.30 per keg, for small lots at store.

Chicago.—The situation in Cut Nails is unrelieved by any improvement, the demand continuing extremely sluggish and inactive. In contrast with conditions in the Wire Nail market, prices are susceptible of shading and concessions of 10 cents a keg are being made by the jobbing trade. Chicago quotations are as follows: Iron Cut Nails, carloads, to jobbers, $2.38; to retailers, $2.43; Steel, to jobbers, in carloads, $2.28; to retailers, $2.33.

Pittsburgh.—We continue to report a very light demand for Cut Nails, and there is no improvement in the market either in demand or prices. It is hoped that when building operations are under full sway again demand for Cut Nails will improve, especially for Shingle Nails. The mills are running light in an endeavor to keep stocks of Cut Nails as low as possible. Regular prices on Cut Nails are being shaded about 10 cents a keg. We quote Steel Cut Nails at $1.90 to $1.95, f.o.b. Pittsburgh, for carload lots, and about $2 for small lots, to which freight to point of delivery is added. Iron Cut Nails are about $2.05, at maker's mill.

Barb Wire.—An improvement is reported in the volume of orders received by the mills. It is not anticipated that spring demand will equal that of last year, but that there will be some increase over present requirements is not doubted. Prices are being maintained at regular quotations, according to information from the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago.—The past week or 10 days has developed some increase in the volume of new business, and the mills are now fully occupied in meeting the demands of consumers for prompt shipment. Now that Fence building operations are active both North and South, the prospects for a fair season's trade are most promising. Prices are reported firm and unchanged. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.38; Galvanized,

$2.68; to retailers, car lots, Painted, $2.43; Galvanized, $2.73; retailers, less than car lots, Painted, $2.55; Galvanized, $2.85; Staples, Bright, in car lots, $2.35; Galvanized, $2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The favorable weather has permitted the resuming of Fence building, and this is reflected in an improved demand for Barb Wire from practically all sections of the country. It is confidently believed that still further betterment in demand will come, and that while spring trade this year will not be as large as last year, it is expected to show up fairly well. We are advised that regular prices are being maintained by the mills, but in some cases jobbers are shading prices slightly on Barb Wire, when sold in connection with other goods. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Plain Wire.—When placing contract orders early in the season, manufacturers of Wire Fencing did not buy as heavily as for 1907. Indications now point to additional requirements as the season progresses. Prices are reported as being maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

Chicago.—With the Fence trade developing in fairly good volume, there is reason to expect some additional purchases of tonnage from manufacturers who bought sparingly when placing their contracts earlier in the season. Indications of a fair amount of fencing orders are good, especially throughout the West. Prices are reported to be firmly maintained. Quotations are as follows: In car lots, to jobbers, $2.08, f.o.b. Chicago, and to retailers, $2.15.

Pittsburgh.—A fair volume of new business is being placed by the Fence trade, but this is not as heavy as at this time last year. Buyers are pursuing the policy of placing orders only for nearby requirements, knowing that the mills are in position to meet any heavier business promptly that may develop. The mills are firmly maintaining prices, and the tone of the market is strong. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

The Stanley Works.—The Stanley Works, New Britain, Conn., and 79 Chambers street, New York, has issued discount sheet No. 15 under date of April 1, relating to catalogue of February, 1906. The changes are moderate and mainly to equalize prices on the less important lines of Butts, ornamental Hinges, Bolts and miscellaneous goods, rather than on the more staple lines.

Sash Cord.—The announcement by leading manufacturers of a reduction of 3 cents per pound on Sash Cord took the trade by surprise. Lower raw material is mentioned as the occasion of the change, but it is hinted by some that makers of standard brands find it desirable, in view of the moderate volume of business, to put Cord on a basis where there will be little temptation to cut prices. The market for Sash Cord may now be represented by a quotation of 21 cents per pound base.

Tacks.—The Tack situation seems to be somewhat improved, as the manufacturers are making an effort to put the goods on a level about 10 per cent. higher than the figures announced a short time ago.

Leather Belting.—Partly on account of the general business reaction leading to a reduced volume of orders, as well as because of the low price of Leather, the market for Leather Belting has for some time shown weakness. Manufacturers have been quoting lower prices on their standard grades of Belt than have prevailed for quite a long period, in competition reaching from 70 and 10 to 75 per cent. discount and even somewhat better on especially desirable orders. The present tendency is slightly toward improvement, as hides have recovered from 1 to 2 cents from their bottom price. Lacing may be quoted in a general way at 50 and 10 to 60 per cent. discount for cut and 20 to 22 cents per square foot for sides.

Pipe Cutters.—The working understanding which has for some time existed among manufacturers of competitive Pipe Cutters, Barnes and Saunders pattern, is disrupted and prices on these goods have been drastically reduced.

Wire Cloth.—Ruling prices and terms on Screen Wire Cloth have been extended to cover deliveries up to July 1. The market for Hardware grade Cloth and Poultry Netting also remains unchanged.

Brass Cocks and Bibbs.—A slight tendency to improvement is observed in the market for Brass Cocks and Bibbs, which have been selling at prices said to be close to cost. Quotations of leading manufacturers have been advanced about 5 per cent. Compression Bibbs may be quoted in a general way at a discount of 70 per cent. and Hardware Cocks at 75 per cent.

Wire Coat and Hat Hooks.—The market for Wire Coat and Hat Hooks is not firm and low prices are being made to competition. Some makers are not meeting the lowest quotations, but the market may be represented in a general way by a discount of 80 per cent.

Wood Screws.—Manufacturers of Wood Screws have reduced the amount which it is necessary to purchase to secure the maximum quantity rebate from $5000 to $3000. The quantity rebates now in force are as follows:

On purchases of $500 worth of Screws invoiced between January 1 and June 30, 1908, 2½ per cent.
On purchases of $1000 worth of Screws invoiced between January 1 and June 30, 1908, 5 per cent.
On purchases of $3000 and over worth of Screws invoiced between January 1 and June 30, 1908, 7½ per cent.

Copper Products.—The prices of Copper and Brass materials are still in the same unsettled condition, fluctuating slightly one way or the other on moderate trading, with slight recessions in price at present. Such orders as are placed are wanted for immediate delivery, and prompt service is insisted on. There appears to be no feeling in the trade that much higher prices will be made in the near future, with the increased production at some of the principal mines. Sheet Copper still remains at 17 cents, base, fixed February 27, with such modifications in actual rates as can be agreed on between buyer and seller.

Solder.—The price of Solder has been moving up for the past two weeks, and has now advanced close to 2 cents per pound.

Cast Iron Fittings.—A better tone is observed in the market for Cast Iron Fittings and slight advances have been made in the quotations of manufacturers, and revised quotations range from 5 to 7½ per cent. higher than a short time ago.

Radiators.—Manufacturers of Radiators have made a slight reduction in prices. The market is quiet, as usual, at this season.

Rope.—Business continues below normal, and demand is estimated at 35 to 50 per cent. of what is usually expected at this season. Following quotations for base sizes represent the market: Pure Manila, 10¼ to 11 cents; B quality grades down to 8 to 9 cents; Pure Sisal, 7½ to 8 cents; lower grades Sisal, 6½ to 7 cents; No. 1 Jute, ¼-in. and up, 6¼ cents; No. 2 Jute, ¼-in. and up, 5¾ cents.

Window Glass.—The more settled weather conditions have not brought the demand for Window Glass up to expectations. Continued dullness may result in a reduction of production by the hand operated factories. In New York and vicinity business is very quiet. The minimum prices recommended by the Eastern Window Glass Jobbers' Association are as follows: Single strength, 90 and 25 per cent.; double strength, 90 and 30 per cent. discount from jobbers' list. These prices are, however, not closely adhered to.

Linseed Oil.—While there is some improvement in demand with the advance of the season, there is an absence of active spring buying. Local quotations are as follows: In 5-barrel lots, State and Western Raw, 40 to 42 cents; City Raw, 43 to 44 cents per gallon. Boiled Oil is 1 cent per gallon advance on Raw.

Spirits Turpentine.—The manipulation of the South-

ern market came to an abrupt termination the last of the past week, which resulted in a marked drop in prices. This has unsettled the New York market to some extent, especially as the Southern market is not steady. At this point buying is of a hand-to-mouth character, at considerable lower prices than a week ago. The New York market is represented by the following quotations: Oil Barrels, 50½ to 51 cents; Machine Made Barrels, 51 to 51½ cents. Locally, demand is light.

Four New Parcel Post Bills.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., April 7, 1908.

THE parcel post campaign has been marked by numerous interesting developments during the past week. The very serious illness of Senator Penrose, chairman of the Senate Post Office Committee, has resulted in the postponement of the consideration of the annual post office appropriation bill in committee at least until the 20th inst., and the advocates of the rural parcel post scheme have taken advantage of the delay to deluge the Senate with petitions and memorials in its favor. Nearly all these appeals have come from subordinate organizations of the National Grange, Patrons of Husbandry, and it is obvious that the real beneficiaries of this project are using this organization of farmers with considerable effect.

The parcel post promoters are not relying upon amending the annual post office appropriation bill, however, for they appreciate fully the parliamentary difficulties in the way, but are laying the foundation for a campaign at both ends of the Capitol to secure favorable reports upon independent measures as soon as the big supply bill has been disposed of. The Burnham and Kean bills, heretofore introduced in the Senate and now before the Senate Post Office Committee, have been selected as the basis of operations in that body, while in the House no less than four measures have been presented during the past week, the varying terms of which indicate a shrewdly conceived plan to unite upon a composite measure to be framed in committee all the advocates of postal changes, ranging from a general parcel post to penny postage.

The Bennett Bill.

The most comprehensive of these measures has been presented in the House by Representative Bennett of New York. It provides for a complete parcel post system based on the European plan, but differing in several important particulars from either the Hearst or Henry bills heretofore introduced, the modifications being designed apparently to bring it into line with the more modern postal methods in use in this country. This bill is as follows:

Be it enacted, &c., That the third and fourth classes of mail matter be, and are hereby, consolidated under the title of "merchandise," with a weight limit of 11 lb., with rates as follows: On parcels up to 3 oz., 1 cent; over 3 oz. up to 6 oz., 2 cents; over 6 oz. up to 9 oz., 3 cents; over 9 oz. up to 12 oz., 4 cents; over 12 oz. up to 1 lb., 5 cents; for each additional pound or fraction thereof, 2 cents, making the rate on an 11-lb. parcel 25 cents. No parcel shall be more than 3½ ft. in length or occupy more than 2 cu. ft. of space.

That this service shall cover all documents styled commercial papers by the Universal Postal Union, including "all instruments or documents written or drawn wholly or partly by hand, which have not the character of an actual and personal correspondence, such as papers of legal procedure, deeds of all kinds drawn up by public functionaries, waybills or bills of lading, invoices, the various documents of insurance companies, copies of or extracts from deeds under private signature, written on stamped or unstamped paper, scores or sheets of manuscript music, manuscript of books or of articles for publication in periodicals, forwarded separately, corrected tasks of pupils, excluding all comment on the work"; provided, however, that such documents be so mailed as to admit of easy examination.

That the service determined by this act shall include free delivery and collection, house to house, of all parcels handled by the Post Office Department, wherever a wagon or car collection and delivery service is now or may hereafter be established. Wherever there may be only a foot service the postman shall not be required to receive or deliver any parcel of greater weight than 5 lb. In the absence of a collection and delivery service the rates of this act shall only apply to the service between post offices, but the notice of arrival of parcels shall in such cases be given to the addressees.

That on all unregistered prepaid mail matter without declared value an indemnity up to $10 shall be paid by the Post Office Department for such actual loss or damage as may occur through the fault of the postal service, and this without extra charge. Certificates of posting shall be provided on demand. On registered parcels of declared value and on which the fees for registration, insurance and postage have been duly prepaid, the Post Office Department shall pay the full value of any direct loss or damage that may occur through any fault of the postal service. The fees for insurance and registration shall be as follows: For registration and insurance up to $25, 2 cents. No claim for compensation will be admitted if made more than one year after the parcel was posted.

Mr. Bennett declines to stand sponsor for this measure, and in presenting it in the House endorsed it as having been introduced "by request," but this formal presentation has served to make it a public document, which after being printed at public expense, can be sent broadcast throughout the country under any Congressional frank.

Mr. Cockran's Auto-Post-Coach Service Bill.

The most remarkable rural parcel post project thus far brought to the attention of Congress has been introduced by Representative Cockran of New York, also "by request." This is a bill "for the establishment of an experimental auto-post-coach rural service." As the title indicates, this bill proposes not only to establish a rural parcel post, but a fully equipped coach or stage service with special facilities for taking children to and from school. The measure provides as follows:

Be it enacted, &c., That the sum of $60,000 be and is hereby appropriated for the establishment of an experimental auto-post-coach service for the coming year, on a number of rural routes, to be determined by the Postmaster-General.

That these experiments are to be made on routes well graded and macadamized, and are to start from post offices at or adjacent to a station on a railroad or trolley line. It is to be a further condition of this service that, for the convenient collection and delivery of merchandise and baggage and for the shelter of travelers, the rural public on the proposed experimental lines shall provide post cabins satisfactory to the Postmaster-General at points on the highways near their respective homes, the postmen and the owners of the cabins to have duplicate keys.

That at least twice a day, morning and afternoon, at hours convenient to the public, two auto-post-coaches equipped for the transport of merchandise, baggage and passengers shall make trips in opposite directions from the same post office over the same course. Sunday services and additional week day services may be provided, as the Postmaster-General deems advisable. The speed capacity of each post coach shall be at least 100 miles per day, and one coach may be made to serve two or more routes. The carrying capacity of each post coach shall not be less than 10 passengers and 1500 lb. of merchandise or baggage.

That all mail matter collected and delivered within the different rural routes shall be in one class, and the rates charged for transportation within each route shall be as follows: On merchandise and baggage, parcels up to one-eighth of the standard suit case, a box 3 x 6 x 12 in., or similar cubic contents, 1 cent; larger parcels up to one-half the standard suit case, a box 6 x 12 x 12 in., or similar cubic contents, 5 cents; larger parcels up to the full standard suit case, a box 6 x 12 x 24 in., or capacity of the standard peach basket, 10 cents; larger parcels up to the capacity of a bushel, 15 cents; larger parcels up to the capacity of a half barrel, 100 lb., 20 cents; larger parcels up to the capacity of a barrel, 200 lb., 25 cents; weight limit, 200 lb.; no carrier to be obliged to carry a parcel over 6 ft. in length. Passenger fares per trip within each route: Adults, 10 cents; children, ordinary single trips, 5 cents; children, to and from school, round trip, 5 cents.

The promoters of this particular measure are counting upon securing the assistance of all organizations interested in improving the public highways, including the National Grange, the various automobile associations, highway commissions, &c. The bill will be urged as a purely experimental measure which "does not commit the Government to anything," an argument that was used very effectively to bring about the establishment of the present rural free delivery service.

Penny Postage.

The popularity of the penny postage proposition is being utilized to help along the rural parcel post projects in every conceivable way. Of course, the parcel post promoters know perfectly well that it would be impossible to put both these innovations into operation at the same time, as penny postage would undoubtedly result

in a temporary reduction in revenue, while a parcel post would well nigh bankrupt the Government; nevertheless it is regarded as a shrewd move to couple them as "desirable reforms." Several of the authors of parcel post bills have therefore presented penny postage measures of a more or less comprehensive character. Representative Griggs of Georgia, whose rural parcel post bill was voted down when offered in the House as an amendment to the post office appropriation bill, has introduced a measure "to establish 1 cent postage on rural routes," which provides that from and after July 1, 1908, the drop letter privilege now existing at post offices not entitled to free delivery service shall be extended to all rural routes. It is not at all clear what Mr. Griggs means, but it is assumed that he intends to prohibit the employment of the 1 cent rate for letters intended for transmission from the terminus of one rural route to the terminus of another route; that is to say, it could not be used for conveying letters between towns which are not connected by rural routes.

Representative Bennett of New York has presented a straight penny postage bill, but, as this measure was received from the same source as the parcel post bill introduced by him, he has also marked it as having been presented by request. It remains to be seen whether the parties who have been instrumental in securing the introduction of this bill can utilize it to aid the campaign for parcel post. Retail merchants everywhere should scrutinize carefully any petitions or memorials offered for their signature which appear to advocate the Bennett bill, and in this connection it may be as well to warn merchants against utilizing stereotyped forms of petitions, except such as may be supplied by their own trade organizations. The most effective way of reaching Congress is through urgent personal letters addressed to the Representatives of the Congressional districts in which the writers reside.

TRADE ITEMS.

J. W. McMANUS, Dallas, Texas, secretary of the Texas Retail Hardware and Implement Association, has issued a circular under date, 19th ult., to every merchant in the State in which he urges those who are not now members of the association to affiliate with it. He also takes occasion to refer to the parcel post campaign in Congress and the necessity of merchants being active in combating and opposing this measure. Merchants are requested to have business organizations in their towns take official action in the way of resolutions protesting agaist this sort of legislation and sending copies of such resolutions to their Senators and Representatives and also to the chairman of the Senate Committee on Post Office and Post Roads.

AFTER 31 years of active connection with the Atlantic Screw Works, Hartford, Conn., during the past 21 years of which period he has been the sole owner and manager, David Tilton has presented the entire plant and business to his son, Fred N. Tilton, to own and manage in his own right. The Atlantic Screw Works was established in 1875 at Castleton, N. Y., and two years later the plant was moved to Hartford, the business being then under the management of George W. Bruce. In 1887 Mr. Tilton succeeded to the sole proprietorship, and in 1902 the present factory, a modern and substantial brick structure completely equipped, was built. Fred N. Tilton has followed very closely in the footsteps of his father in the business. He has been associated with it for about 20 years and knows its every detail.

THE fourteenth semiannual meeting of the American Hardware Manufacturers' Association will be held concurrent with the eighteenth annual convention of the Southern Hardware Jobbers' Association at Hot Springs, Ark., on June 9, 10 and 11. The headquarters will be at the Arlington Hotel. All applications for reservation of rooms should be addressed direct to the hotel.

THE BAUSCH & LOMB OPTICAL COMPANY and the Bausch, Lomb, Saegmuller Company, both of Rochester, N. Y., and the Carl Zeiss Optical Works, Jena, Germany, have been consolidated under the style of the Bausch & Lomb Optical Company. It is the intention to manufacture certain products of the Zeiss Works in the United States, but the business in Jena will continue under the old style.

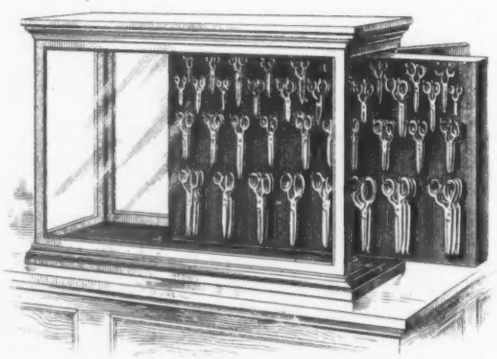
THE PAPE-THIEBES CUTLERY COMPANY, St. Louis, Mo., has been incorporated with a capital stock of $5000, the incorporators being Walter Pape, Henry Thiebes and Margaret Thiebes.

M. D. HALPIN, 62 Reade street, New York, is marketing the improved Chatham Fireless Cooker, manufactured by the Manson Campbell Company, Detroit, Mich., which was illustrated and described in our last issue.

THE Boston office of Landers, Frary & Clark, New Britain, Conn., has been removed to 157 Summer street.

CUTLERY SHOWCASE.

THE attractive glass case here illustrated stands on the end of a counter in the store of J. R. Gladwin, Westfield, Mass. It is perhaps 4 ft. long by 1 ft. wide, and between 3 and 4 ft. high. The top and base are finished with a heavy molding, and all the sides are of glass. Within is a frame or sample board, large enough to fill the inside of the case studded with hooks. On one side of the board Scissors and Shears are kept, and on the other Razors and Razor Strops. As the hooks are long



Cutlery Showcase.

enough to hold several articles of the same size, the case affords facilities for both display and selling stock. In showing or handling the goods in the case the sample board is pulled out at one end, as indicated in the illustration. It runs easily on Sash or Trunk Rollers set into the floor of the case.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM THE BURBANK COMPANY, Berlin, N. H., whose Hardware and Plumbing establishment was destroyed in the fire that visited that city in February.

FROM WOLSFELD-BROWER HARDWARE & IMPLEMENT COMPANY, which has been incorporated at Oriska, N. D.

FROM FOREST CITY HARDWARE COMPANY, Rockford, Ill., which has recently been incorporated to deal in general Hardware, Stoves, Sporting Goods, &c.

FROM ENYEART BROTHERS HARDWARE COMPANY, which has recently opened a store at Hanford, Wash. The company's post office address is Fordnah, Wash.

FROM W. E. STREET, who is erecting a new building in Seneca, Mo., to be occupied by his stock of Shelf Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, Roofing and Guttering.

Logan Bros., Havensville, Kan., have sold their Hardware, Stove, Implement and Vehicle business to Witter & McKee.

System for the Retailer.

Ninth Article.

SPECIAL ORDERS AND SPECIAL PRICES.

BY JOHN A. MANSON, BURLINGTON, VT.

THE wide awake Hardware merchant carries a stock of goods well adjusted to the demands of the trade in his locality, and is continually studying those demands and adding to or cutting down his stock accordingly. Considering the great variety of goods that are manufactured in the Hardware line it is surprising how comparatively little of that variety the average Hardware

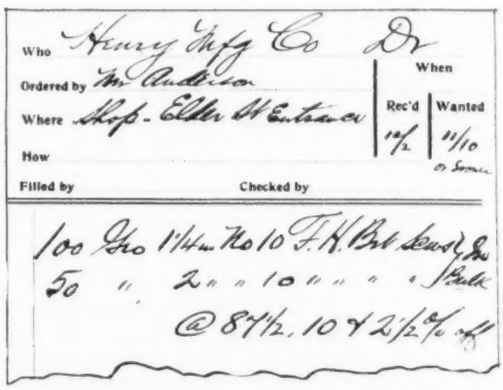


Fig. 1.—Special Order for Local Customer.

store requires. The experience and study of the merchant is brought sharply to task to select wisely what his trade requires, so that his stock will be moving profitably all the time. From experience the merchant acquires a general knowledge of the various goods made by the leading Hardware manufacturers, and can take orders intelligently for many goods which he does not carry in stock, ordering them especially for his customers. These special orders include all kinds of regular factory stock articles, some of which the merchant may carry to a limited extent in his regular stock and some of which he may not stock at all, but for which he may have a periodical demand or an unusually large occasional de-

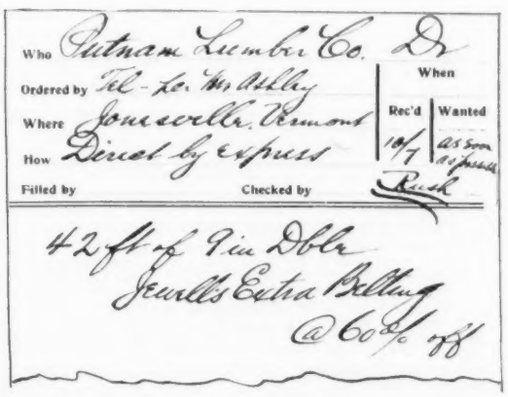


Fig. 2.—Special Order for Factory Shipment.

mand from a customer. Frequently these special orders are for goods not carried by the manufacturer, but which the merchant knows how to order and get through from the factory in a satisfactory manner. Special orders should be taken on the regular order slips and carried on a special file. Fig. 1 is an illustration of a special order for a local customer.

Particular attention should be given to "When wanted," and the goods hurried forward accordingly. When the goods are billed in to the merchant the special order should be attached to the invoice, and on the arrival of the goods in the store the special order should go through as a part of the day's business, being entered up in the delivery record, delivered accordingly and becoming one of the routine transactions. Fig. 2 shows a special order for goods shipped direct from factory to an out of town customer.

As soon as the merchant receives the factory invoice the goods should be charged up to the customer and a bill sent, on which would be noted when and how the goods were shipped from the factory. A record of prices on special orders should be kept—an indexed book serves

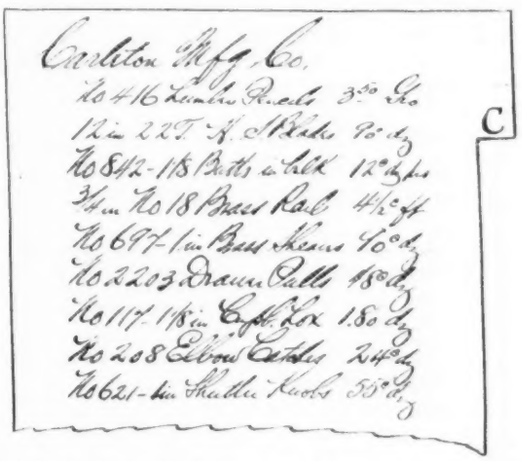


Fig. 3.—Record of Prices on Goods Ordered Specially for Regular Customer.

the purpose—Fig. 3 being an example of a page from such a book. Herein are special prices, representing some goods that are not carried in stock by the merchant and some goods which are carried in stock, but used in unusually large quantities and specially ordered. On these the customer is entitled to special consideration.

McNUTT & MUSGRAVE BROS., Huntsville, Ill., recently issued their third annual catalogue which was mailed to every farmer within a radius of 8 or 10 miles of the town. The catalogue is 9½ x 6½ in., and contains nearly 50 pages. It has a striking red cover, with cord for hanging, and the typographical make-up and printing is very creditable. At the top and bottom of each page are the sentiments, "You'll find it pays to trade at McNutt & Musgrave Brothers," and "the old Hardware store on the corner where good goods are sold right." An index to the catalogue is supplied on the inside of the front cover, the contents including, besides the representation of Hardware and related lines, several pages giving useful tables of weights and measures, information about Seeds, and "some things worth remembering." Several days in advance of the catalogues postals were sent out calling attention to it, and cordially inviting the recipients to make the store headquarters when visiting the town.

WILLIAM J. LA ROCHE, president of the Metropolitan Hardware Company, New York City, died at his home in Brooklyn on the 5th inst. Mr. La Roche was a son of Dr. William Pell La Roche, and was born in New York in 1853. He began his business career with a dry goods house, but later became interested in the Hardware line, eventually becoming a member of the firm. In 1889 the business was reorganized under the name of the Metropolitan Hardware Company, and as a result of its advertising methods, a special feature being made of display and sales outside the store, an extensive trade has been built up. Mr. La Roche was a member of many clubs, a conspicuous sportsman, and was well known and highly esteemed.

J. C. McCARTY & Co., 21 Murray street, have been appointed sales agents for the United States, outside of the New York metropolitan district, and Canada, for the Acme Ball Bearing Sales Company, 56 Warren street, New York, manufacturer of Acme Ball Bearing Casters.

THE Baumann Hardware Company, Wausau, Wis., has been incorporated with a capital stock of $25,000, the incorporators being R. Baumann, Henry Seim, Jr., and Anna Bobrinz.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

SIDNEY STEEL SCRAPER COMPANY, Sidney, Ohio: Illustrated catalogue No. 9, referring to Haslup Wheel and Drag Scrapers, Contractors', Railroad and Grading Plows, Barrows, Trucks, &c.

A. J. HARWI HARDWARE COMPANY, Atchison, Kan.: Illustrated catalogue No. 52, referring to Harness, Saddles, Horse Collars and Strap Work.

STANDARD MFG. COMPANY, Shelby, Ohio: Illustrated circulars of Double Acting Door and Floor Springs, and Washing Machines.

BUTLER BROTHERS, New York: "Our Drummer," catalogue, No. 660, for April, containing illustrations and net prices of a large variety of goods suitable for the retail Hardware merchant.

KNAPP-SPENCER COMPANY, Sioux City, Iowa: New pages to be inserted in its ninth edition loose leaf catalogue.

A. J. HARWI HARDWARE COMPANY, Atchison, Kan.: Spring catalogue No. 53, devoted to Farm and Garden Tools, Lawn Mowers, Haying Tools, Harness, Creamery Supplies, Ice Cream Freezers, &c.

WM. FRANKFURTH HARDWARE COMPANY, Milwaukee, Wis.: Extra gummed pages, for insertion in its catalogue, devoted to Lock Sets, Store Door Handles and Locks, Push Plates, &c.

MASBACH HARDWARE COMPANY, 84 Warren street, New York: Condensed catalogue and price-list of 145 pages, containing 1800 illustrations of good selling articles.

ELECTRIC SAD IRON COMPANY, Detroit, Mich.: Illustrated folder, describing the Superior Electric Flat Iron.

MCMASTER-CARR SUPPLY COMPANY, formerly McMaster-Davis Supply Company, 174-176 Lake street, Chicago, Ill.: Catalogue No. 14, devoted to steam specialties and general supplies for mills, mines, railroads, contractors, engineers, steam fitters, machinists, millwrights, &c. The catalogue is fully illustrated with list prices and has an index covering 10 pages.

S. W. CARD MFG. COMPANY; Mansfield, Mass., New York office, 132 Liberty street: Catalogue No. 25, devoted to Taps, Dies, Screw Plates, Die Stocks, Tap Wrenches, &c. The catalogue lists Machine Screw Taps and Round Dies to the new A. S. M. E. standard with complete tabular information. Changes have been made in the cutting sizes and threads in some Screw Plates, and a complete line of Taps, Dies and Screw Plates has been added to conform to the new A. L. A. M. standard and to the French standard (metric system) for automobile manufacturers and repairers.

H. CHANNON COMPANY, Market and Randolph streets, Chicago, Ill.: Manufacturers and distributors of machinery and general supplies, catalogue No. 33. This relates to goods for steam and electric railroads, contractors, bridge builders, stone quarries, machine shops, factories, mines, blacksmiths, saw, paper, flour and cotton mills, elevators, electric light plants, water works plants, &c. The catalogue describes more completely than former editions, the lines of goods handled by the company.

SARGENT & CO., New Haven, Conn., and 94 Center street, New York, four extra pages, 946 A, B, C and D for 1901 catalogue, describing, with illustrations, their complete line of Steel Squares, grouping all numbers in the various finishes.

BETTES & EBSEN, 62 Reade street, New York, have recently established themselves at this address, where they will conduct a business in factory, mill and machinists' supplies, handling Hardware, Machinery, Chucks, Shafting, Hangers, Pulleys, Belting, &c. They are making a specialty of Hard Fiber in sheets, tubing, Rods, Washers, &c.

CONTENTS.

DO LOCAL RETAIL MERCHANTS EMPLOY RURAL CARRIERS?

THE rules now regulating the rural free delivery branch of the Post Office Department permit carriers to handle packages at the instance of persons living on their routes and to receive remuneration therefor. If it could be shown that the opportunity thus afforded was made use of to a considerable or increasing extent and was proving a convenience and advantage to country merchants, no little force would be added to the argument of parcel post advocates for their proposed legislation. Readers of *The Iron Age* are aware of the claim of the so-called postal reformers that merchants will benefit through the formal establishment of a service by which they can deliver packages through their local post office, especially since they will have a decided advantage in rate over mail order houses and others who must use the general mails before reaching the rural route.

The converse, however, is equally true. If it appears that the opportunities now existing are made little use of and merchants are lukewarm regarding the proposed service or actually opposed to it, the argument referred to loses much of its force. This is the view which our extensive correspondence and somewhat thorough investigation would indicate as the correct one. Of the many small merchants whom we have heard from in districts which would seem to be the best fields for such service, very few make more than semioccasional use of the rural carriers and the majority do not employ them at all. This applies to the general run of merchants as well as to the Hardware trade. The following are fair samples of the advices received:

FROM A NEW HAMPSHIRE TOWN: Our rural carrier says he does a very small amount of business in the way of delivery of goods.

FROM AN INDIANA TOWN: I do not find rural carriers of much use in delivering goods. It is very seldom a farmer sends in for anything to be brought out by them. The small charge of 10 or 15 cents is too much for them.

FROM A TOWN IN FLORIDA: We find that the rural carrier is little or no use to us in the way of making deliveries.

FROM A MERCHANT IN NORTH DAKOTA: The merchants do not use the rural route here for delivering goods. We do not find that it builds up our trade.

FROM A WEST VIRGINIA MERCHANT: The R. F. D. carriers have never handled anything for us.

FROM A TOWN IN ILLINOIS: I have not used the rural carriers to deliver goods.

FROM A TOWN IN KANSAS: We find that merchants here are not using this means of delivery very much.

Some of our correspondents write at greater length and make interesting suggestions which throw valuable side lights on the subject and add much to the force of their advice. A village merchant in Michigan writes:

Never Did Us Any Good.

This is a village of about 1000 population; one-half mile from here is another village of 1200 people. From this place there are five R. F. D. routes, and from our neighboring village there are two R. F. D. routes. We do a cash business and sell at exceedingly low prices, in competition with the catalogue houses, and have no reason to complain as to the volume of our business. But the R. F. D. has never done us any good. We have never received to exceed a half-dozen orders to be sent out by the mail carriers, and these for very small items.

The present system of R. F. D. certainly does not help the small merchant, and the parcel post would in a short time put most of them out of business.

Not Half a Dozen Packages a Year.

FROM A TOWN IN TEXAS: We have 8 or 10 rural routes going out from our town, and we do not find the carriers useful for delivering goods to our farmer friends. They very seldom have more than room enough in their wagon to carry the mail, much less a few packages of merchandise. None of them like to deliver packages. We do not average sending out a half-dozen packages in 12 months.

Occasionally Used by the Druggist and the Doctors.

FROM A TOWN IN IOWA: My observation has been that the merchants of my town do not use the rural carrier to any great extent. The druggist and the doctor make use of this method, occasionally paying the carrier a nominal price for the accommodation. Merchants generally, however, resort to this plan only in extreme cases.

Carriers Don't Want to Be Bothered.

FROM A SOUTH CAROLINA TOWN: The rural carriers do not want to be troubled with merchandise, but sometimes they don't mind a very small package. As a rule they say their mail is all they want. It seems if such a thing should be put in practice it should in independent. We *don't want it.*

Present Regulations Misunderstood.

Many merchants seem to attach so little importance to the opportunities of delivery by rural carriers that they have not taken the trouble to investigate the possibilities or become familiar with the existing regulations. Even the carriers and postmasters themselves show little interest in the subject and are not at all conversant with the present rules. Some do not even know that carriers are now permitted to handle packages for dwellers on their routes. This is shown by such letters as the following:

FROM A TOWN IN MICHIGAN: We have made use of rural carriers on different occasions, but not to any great extent. The last package we left at post office for them to take was returned to us by the postmaster who said it was against the rules, and required us to pay regular rate of postage, which we did. Since then, about two or three months ago, we have not used this method for country delivery.

Package Returned.

FROM A MARYLAND MERCHANT: We have never used the rural carriers for delivering goods on their routes. We always understood the mail carriers were prohibited by the Department. We think the prohibition feature well considered on account of the time it would take from the prompt delivery of the mail. I do not think the rural carriers deliver any goods in this zone.

Thought It Prohibited.

Some of the Practical Considerations

relative to this sort of service which present themselves to representative merchants are brought out in the folfowing letters. It will be noted that all are in the nature of objectionable features, such as the frequent difficulty in sending just what is wanted and resulting dissatisfaction, the confusion and trouble arising from soiled, broken or lost packages, on which the merchant would always be expected to stand the loss, the necessity of making small charges which would often be hard to collect, &c.:

Causes of Dissatisfaction.

FROM A TOWN IN WISCONSIN: We think we voice the sentiment of all the merchants in our vicinity, that rural delivery is a detriment to the small town, and as for using the carriers for delivering packages we do send something once or twice during the entire summer, and even this is not satisfactory, for should it happen we did not send just what the farmer ordered, he is dissatisfied. (The farmer is not a business man and is very exacting.) On the other hand, if we did not substitute as best we could they would not like it, so in consequence we do not cultivate the rural delivery trade.

Makes Small Troublesome Accounts.

FROM AN ILLINOIS TOWN: While we do deliver some goods by rural carriers, our trade from that line will not amount to $25 a year, and it makes a lot of small accounts that are often hard to collect. We find it more trouble to us than the good we get from it.

Use of Telephone and Trolley Lines.

FROM A TOWN IN ILLINOIS: Our business with rural carriers is next to nothing, due perhaps to the fact our country trade is limited. We have five interurban railroad lines entering our place, which carry express, and we do more or less with them. Many times farmers will telephone and we send via electric line. We understand that the dry goods stores do considerable business in small articles through rural carriers.

The Most Important Consideration

and that most frequently referred to by our correspondents is that the use of a rural delivery tends to keep the farmer at home. This is obviously a bad thing for the merchant, as it tends to reduce his trade; it also increases the difficulty of keeping in touch with his customers and talking with them face to face, which is by far the most satisfactory way to do business. It is also a bad thing for the farmer, tending to make his purchases less intelligent, to deprive him of the broadening influence of the town and to keep him out of touch with conditions and events in the world about

Keeps Farmers at Home.

him. These important points are brought out in the following letters:

Can Do More Business on the Spot.

FROM A TOWN IN DELAWARE: Very little use is made of the rural carriers by the merchants of this town. We do not think it of very much advantage. We believe it is better to have the country trade come to your stores, as we can do more business with them on the spot than at a distance. They will buy more goods than if they order by mail and have goods delivered by carrier.

No Special Benefit to Anyone.

FROM A MINNESOTA TOWN: We are doing business in a small town and it has only happened a few times that customers have telephoned us for goods to be taken out by the rural carriers, so I do not see any special benefit in this way of delivering goods. I would rather have the customer come to my store and do business face to face. In my opinion the rural free delivery is only an expense to the Government and no special benefit to any one.

Tends to Keep Farmers at Home.

FROM A TOWN IN VERMONT: We are very well satisfied with the present rules in regard to rural carriers taking packages to customers. Sometimes it is convenient for the customers and they have to pay possibly 5 to 10 cents for the service, and a good many times they make no charge. We do not think that the rural mail is very much benefit to the merchants in small towns, as it tends to keep the farmers home, and it is not necessary for them to come to town as often as it was before the rural routes started.

We are very much opposed to any change in the postal rates on merchandise, and we are in favor of reducing letter postage to 1 cent for one-half ounce or fraction of half ounce. We believe this change would benefit the most people.

A Great Injury to the Towns.

FROM A TOWN IN VIRGINIA: I very seldom have calls to send goods to the county by rural carriers. I don't think that in our county they carry merchandise very much. I don't hear of our merchants sending goods by them, as the mails about fill their wagons. My opinion is that this R. F. D. does a great injury to the towns, in that they keep the country people at home. Not having to come to town for their mails we don't see them as often as before.

Would Close Up the Country Stores.

FROM A MERCHANT IN WEST VIRGINIA: We feel satisfied that rural delievries would not prove to be practical for this locality and, furthermore, would be an injury to business generally. The matter would cause a great deal of confusion, packages would be broken up and soiled and sometimes lost, and then the parties to whom the goods were addressed would want to hold the merchant good for the loss, and it would cause all kinds of confusion. If that practice should become general it would close up all the country stores and also be a great detriment to the business in the smaller towns along the railroads.

As a rule our people in the country come into the towns to do their trading; they prefer it, and we as merchants encourage that, because it is more satisfactory to both parties. This is my opinion, and I think it is the sentiment of the majority of the business people of this locality.

Not a Single Merchant Has Used the System.

A merchant located in a small city in Ohio, who has made a thorough investigation in his locality, sends the following interesting and comprehensive statement:

At no time since the institution of the rural delivery have we ever been called upon to use, or in any way made use of, the system for any delivery whatever. The writer has personally made inquiries along this line and has not been able to locate a single merchant of any class who has used at any time this system. If they are so permitted, there is either ignorance of it in this section or our people have been extremely indifferent in the matter. The postmaster of this city advises me that practically nothing along this line is done, beyond the outputs that have been made at different times by the mail order houses, at first partially successful, but at this time forbidden. We think this statement will cover largely the situation in Ohio at all points.

Used Only by Catalogue Houses.

G. W. Hoover, Audubon, Ia., has sold the Hardware and Implement departments of his business to Christensen & Lang.

Sharpening Stone Window Display.

THE PIKE MFG. COMPANY, Pike, N. H., recently arranged an effective window display in the new single pane window of its New York branch, 151 Chambers street, containing Sharpening Stones and accessories of its own production. In part this exhibition is a practical demonstration or example for the retailer, showing the possibilities of even so prosaic a line of merchandise as Sharpening Stones. In the group, tastefully arranged, were India, Washita, Turkish and Arkansas Oil Stones, Razor Hones, Knife Sharpeners, Scythe Stones, with Desk, Automobile and Sportsmen's Knife Stones, Silver Mounted Carving Knife Hones and the Kantbreak

Sharpening Stone Window Display.

Indestructible Corundum and Emery Knife Hones, the latter in a unique display stand of natural finished wood. There was also a new cabinet assortment, with glass top and sign; also some of the company's Stonoil, of high grade, for sharpening purposes and for light work, such as guns, clocks, &c. Exhibits of such character invariably attract more attention if action of some kind is added. In this instance a Pyko Grinder was fitted up easily and inexpensively by utilizing the fan motor, by taking the smallest cogwheel of another Pyko and attaching to the axle of the motor, using an extra long chain with which to connect the motor and Grinder, the wiring detail being the same as for a fan or any light service. A long slicer or carving knife was suspended so that by a slight addition to the Grinder the blade was struck at every revolution to attract the attention of passersby. An accompanying inscription read thus: "There's a place for this Pyko Grinder in your home or your shop. Does the work quickly, accurately. Don't have dull knives on the table; dull tools in the shop. Use a Pkyo." The hanging clock consisted of a 16-in. Corundum Wheel, with Arabic numerals to form a dial, with hour and minute hands operated by an inexpensive eight-day clock movement at the back to give actual time.

THE PORTABLE CONSTRUCTION COMPANY, 16 South William street, New York, has issued a circular containing descriptions and illustrations of its "Permanent" bungalows and cottages. These are offered in five styles and sizes, B, C, D, E and G, varying in size from 10 x 22 ft., with approximate weight 2500 lb., and containing one or two rooms, to 20 x 36 ft., with approximate weight 15,000 lb., and containing seven rooms, all with front porch. It is stated that with the aid of simple and comprehensive instructions furnished by the company the bungalows can be erected in from one to three days, the latter time being required in connection with the largest size. The company furnishes the paint and hardware for the cottages, so that when erected and painted they look new and fresh, and show no dirt spots or transportation marks or scratches.

THE COMMONWEALTH OF AUSTRALIA AND THE DOMINION OF NEW ZEALAND.

IV.

BY JOHN L. SARDY.

New South Wales.

NEW SOUTH WALES is the oldest settled State of the Commonwealth, having been made a colony in 1790. Sydney is the capital, with a population of about 500,000. The total population of the State is about 1,496,000, and the area over 310,000 square miles. Like Niagara Falls Sydney Harbor is world famed, and the people of New South Wales take as much pride in it as though they had made it themselves, instead of its being the handiwork of Dame Nature, which more often than not they forget.

There are over 3000 miles of railway in the State and interstate connection exists with Victoria, South Australia and Queensland. The total trade of the State is somewhat more than £66,000,000, the value of the exports running close to £37,000,000.

Sydney is, of course, the largest city in the State, but Newcastle from a coal shipping point of view is one of the important towns in New South Wales.

Victoria.

Victoria, except Tasmania, is the smallest territorially of the six States, although larger than England, Wales and Scotland combined, the area being 87,000 square miles. At one time it was part of New South Wales, but was made a separate colony in 1851. It was in this State that the great and at that time unheard of wealth of gold was discovered.

Melbourne, the largest city in the State, with a population about the same as Sydney, is more like an American city than the latter, which is built after the English style. Melbourne boasts of its cable line, which has been running, it is said, for years without ever a breakdown. At any rate the management is excellent. The total railroad mileage in the State is about the same as in New South Wales, but the trade is less, being about £45,000,000, exports exceeding by £400,000.

As in Sydney, there are many wholesale and retail Hardware establishments carrying full lines, mostly made in England, the United States and Germany. A good many of them occupy fine, up to date buildings, and it may be said pretty well all of them understand their business.

One of the largest Hardware firms perhaps in Australasia, with its head office in London, having extensive establishments in Melbourne, Sydney and the chief business points in New Zealand, import American Hardware nearly as extensively as English, and very much more than German. It will not be gratifying to our Wood Screw manufacturers to learn, however, that this firm, and others as well, prefer the English Screw, the American make being looked upon with disfavor because it is said the heads break off. The Wire Netting imported by this firm is all of English manufacture, but German Netting is coming in, being cheaper. The Wire Netting maker has to thank "'Brer Rabbit" for this large Australian trade. Firms think nothing of carrying 100 miles or more in stock.

Queensland.

Queensland, like Victoria, was at one time part of the old colony of New South Wales. It comprises the whole of the northeast portion of Australia, covering an area of 686,000 square miles, providing for a population of 503,000 and capable of sustaining many thousands more.

The northern part is separated from New Guinea by Torres Straits passing between the Arafura Sea and the Coral Sea, and is only about two degrees south of the equator, so it is exceedingly hot. At the same time it is a fertile country and capable of development in the hands of an enterprising people, but here the labor element comes in. White men cannot or will not work in North Queensland. The yellow race is the one for that job, but the white race won't have them, and so this great tract of land remains undeveloped.

Brisbane is the capital, situated at the head of Moreton Bay on the river from which it derives its name. The railroads cover about 3000 miles and the state trade amounts to about £18,000,000, exports making up £12,000,000 of this sum.

South Australia.

This immense state of over 900,000 square miles, extending from the Southern to the Indian oceans, and distant from Sydney over 1000 miles, gives some idea of the magnitude of Australia, but the population is sparse—378,208 in 1905. It is a great fruit country. We pride ourselves upon our peaches, but South Australia can give us cards and spades and beat us both in quality and price and as for grapes she is a rival beyond compare! Think of great, luscious grapes, big as plums, for 3 or 4 cents per pound! As a wine producing country South Australia leads all the other commonwealth states. In 1861 the production was 182,000 gal., in 1906 it was 2,655,947 gal.

Adelaide, the chief city and capital, is about 10 miles distant from Port Adelaide, where the over-sea steamer docks. Thence the traveler proceeds by rail. There are nearly 2000 miles of railroads in the state and the last report shows an annual trade of over £19,000,000, of which total imports form less than half, to the extent of £1,000,000.

Western Australia.

Western Australia, sometimes called Westralia, is about one-third of all Australia in size, containing nearly 976,000 sq. miles, with over 2000 miles of railroads within its boundaries. It is not so many years ago when this great state was scarcely explored, but the discovery of gold changed all that. To-day the population is about 250,000, and the gold output per annum is nearly £8,000,000. The annual trade is about £17,000,000, £10,000,000 of which consists of exports.

Perth, the capital and chief city, has a population of about 46,000, and is reached by sea to Fremantle, the port, 14 miles distant by rail. Kalgoorlie is now the gold field. At one time no regular water supply existed, but the government carried through a huge water pipe line from Perth, 350 miles away, and now the supply is ample. The piping is not cast iron, but steel, known as patent locking bar joint, one-half of which was made in Germany and the other half in the United States. The total cost of construction was £2,710,000.

Perth is a modern city, with good hotels and fine business buildings. One of the latest and perhaps most up to date and substantial in all Western Australia has been constructed and is owned and occupied by a well-known Hardware importer. Skyscrapers are not constructed in Australia, hence this structure is not more than four stories high, well built of brick and stone, and it is worthy of note that almost all the material used was produced in the State. The building is lighted throughout by both incandescent, gas and electricity, and on the third floor is a commodious bathroom, provided with a modern plunge and shower bath. There are two elevators, one for passengers, the other for goods, both being supplied by the Otis Company of New York. The city is well equipped with electric car lines, and besides the regular passenger cars a water wagon or car provided with four spouts, two at each end is regularly run over the line to water the streets.

Barrett Hardware Company's Fire.

IN the disastrous fire which occurred last week at Joliet, Ill., the establishment of Barrett Hardware Company was totally destroyed. The company announces that it desires to receive catalogues, price-lists, &c., from firms which it has been patronizing, and especially requires duplicate invoices of goods shipped since March 1.

THE PRITCHARD-STRONG COMPANY, Rochester, N. Y., is distributing a pamphlet showing attractive window displays of its Prisco Lanterns, in which the Uncle Obediah advertising device figures prominently. The company now has a small sample assortment of Lanterns, with which is given free a life size lithographed cut-out of Uncle Obediah.

MR. CORNISH'S ADDRESSES AT THE BUFFALO CONVENTION.

IN presenting the address on Paint legislation which appeared in our issue, 26th ult., as having been delivered at the recent annual meeting of the New York State Retail Hardware Association at Buffalo, we were in error in ascribing its authorship to E. J. Cornish, president of the Carter White Lead Company, Chicago. The address was that of G. B. Heckel, Philadelphia, secretary of the Paint Manufacturers' Association of the United States. The error was peculiarly unfortunate, inasmuch as the views expressed by Mr. Heckel are at variance with those held by Mr. Cornish, who is the head of a concern which emphasizes the fact that it manufactures nothing but a strictly pure White Lead, and is doing all in its power to educate customers to a realization of this. Mr. Cornish's views on the subject of "Pure Paint Laws" are expressed in the following address which was delivered at the banquet of the New York State Association:

While corroders are commonly believed to be in favor of Pure Paint laws, and the grinders of Mixed Paint against such laws, I personally doubt the necessity of any legislation upon this subject in order to bring about the reform desired.

There was a time when corroders were as guilty of adulterating White Lead as some of the Mixed Paint manufacturers are to-day. All of these substances formerly known as adulterants, later as "inert extenders," and at the present time called "reinforcers," were formerly used by White Lead corroders to cheapen the product. If barytes, silica, china clay and such like substances really improve White Lead, corroders themselves would use them at the present time. These substances are much cheaper than White Lead, and their use would mean a greater profit to the corroder if he could use this cheap material without injuring his product.

Pure White Lead.

The label you read on the White Lead keg is in itself evidence of the practice pursued by corroders at one time. You read there, "Strictly Pure White Lead," why not "White Lead" or "Pure White Lead?" I will explain: At one time corroders adulterated their White Lead with these so-called "inert extenders" or "reinforcers," as they are now termed. The results were not satisfactory to the consumer. Painters found that their jobs would not stand as they formerly did when nothing but straight pure White Lead and Linseed Oil were used, consequently painters demanded a pure product—they wanted material which would guarantee results to their customers, and as a result of this demand some corroders began to put out a brand of "Pure White Lead."

At this time the better corroders ceased manufacturing all but "Strictly Pure White Lead." The corroders, who continued to adulterate their produet, failed in business. To-day there is not a corroder in the United States to my knowledge who sells a brand of White Lead which is not strictly pure. Corroders are striving to improve the quality of their products. The method of corrosion is being improved upon. Modern methods have been adopted. We are making Lead to-day of superior whiteness, and the result is that corroders are now turning out better White Lead than ever before.

Public Demand.

This then is the history of the growth of trade in the manufacture of white lead without any law whatsoever regulating the matter. I personally believe the same would result in the Mixed Paint business in time, but whether necessary or not the public is demanding pure food laws and pure Paint laws, and, whether willing or unwilling, the Mixed Paint grinders must yield to this public demand. The question, as at present presented, relates solely to the form of the label.

Shall the maker of adulterated Paints give the trade name by which various adulterants are commonly known, or the scientific name? Shall they say barytes, or sulphate of barium? The former will be known at once, the latter will permit a few more years of deception.

Care should be taken in framing pure Paint laws so as not to injure any person or stop invention. If any substance can be found that is a better pigment than white lead its use should be encouraged. If any substance can be found that when mixed with white lead cheapens the cost without injuring very much the quality of the product the public should have a part, at least, of the benefit of the cheaper cost. It ought not to be sold as white lead.

Barytes versus White Lead.

Expert chemists have testified that oleomargarine is better than butter—it does not turn rancid—keeps better and is equally as palatable. Without questioning the truth of their statements, if oleomargarine costs from 5 to 7 cents a pound and butter from 30 to 40 cents, it is manifestly unfair to the public to sell them oleomargarine as butter at the butter price. In like manner we had some expert chemists testify that barytes is a better pigment than white lead. Even if this were true the public ought not to be compelled to pay white lead prices for barytes, which costs about $15 a ton, and to sell barytes as white lead is a manifest fraud upon the public. Barytes has been used as an adulterant for many years, but its virtue, if it has any, never became known to anybody except corroders and grinders of Mixed Paints, because it has been sold not as barytes, but as white lead.

Whoever heard of any expert chemist or manufacturer alleging that barytes was better than white lead until the advent of these pure Paint laws? If barytes, silica, china clay and other so-called "inert extenders," or, to be more up to date, "reinforcers," really possess the virtues claimed for them, these substances are indebted to the pure Paint laws for allowing their worth to become known to the world. For certainly no one ever made such claims for them while they were masquerading as white lead.

If the term "reinforced pigment" was used to indicate that white lead is utilized to reinforce barytes, silica, chalk, clay, &c., it would be nearer the truth. White lead needs no reinforcing.

White Lead and Its Manufacture.

We also take pleasure in giving the following extracts from Mr. Cornish's interesting address at one of the sessions of the convention on the subject of White Lead and its process of manufacture:

I am greatly honored in being invited to address you upon the methods by which dark metallic Lead and dark coke or tan bark are transformed in a product, remarkable for its whiteness, that has become the standard white pigment of the world. Changing water into wine does not appear more miraculous than the changes that are daily wrought in the manufacture of Lead pigments. Pure metallic Lead, subjected to heat in a furnace, takes up oxygen from the air and forms Red Lead, brilliant in color, perpetuating in appearance the flame in which it was born, and pronounced by the experts of the United States Government as better than galvanizing or any other known preservative of iron and steel.

The same Pig Lead, subjected to a little higher heat taking up a little less oxygen, produces yellow litharge—useful in many ways, but most remarkable in being necessary in the manufacture of Glass of the greatest clearness and transparency.

Burn the carbon out of ordinary White Lead, add oxygen, and there is produced a substance identical with Red Lead in chemical composition, but in some mysterious way a beautiful orange in color, giving it the name of orange mineral.

Why the oxides of Lead should be red, yellow or orange, the hydroxide, carbonate, sulphate and sulphite of Lead white and the sulphide of Lead black, while the pure metallic Lead is blue, are questions the scientists cannot answer, any more than the father can answer the inquiry of his child, "why sheep ate grass and grew wool, and cows ate grass and grew hair."

There is surprisingly little in the technology of corroding that can be called established. Book writers and learned authorities have made many mistakes and advanced theories that have led corroders into many expensive errors. In the manufacture of White Lead today, much is empirical. The tendency of corroders is to follow safe, approved customs, rather than to embark upon proposed improvements that may prove deceptive.

Pure Metallic Lead.

In the manufacture of White Lead, only the purest metallic Lead is used. It must not contain over .003 per cent. of copper, iron, zinc or bismuth, .005 per cent. of antimony and 1 ounce of silver to the ton of Lead. If any of these ingredients are present in excess of the amount mentioned they will manifest themselves in low percentage of corrosion or defective color of the finished product. Extreme whiteness indicates perfect corrosion. The whiter the Lead, the more value it has as a Paint pigment, because of its ability to produce the softest, clearest tints.

Corroding Processes.

Several hundred patents of processes or improvements in processes for making White Lead have been taken out in this country and Europe. They may all be divided into three classes:

1. The old Dutch or Stack process. Probably four-fifths of the White lead made is by this process.

2. Chamber processes in which the conditions of the Stack are sought to be reproduced in chambers. The Carter process has been the most successful of this type.

3. Precipitation processes. There are two plants in the United States using these processes, both of which I believe are reasonably successful, but neither of which can I describe.

Dutch Process.

In the Dutch process the Pig Lead is melted and run into "buckles" or perforated disks about 6 or 8 in. in diameter and ⅛ to ¼ in. thick. These buckles are placed in earthen jars, in the bottom of which is acetic acid or vinegar. These jars are placed in layers and covered with tan bark—first, a layer of jars, then a layer of tan bark, &c., giving to this process its name of "Stack" process. When the stack is complete it begins to heat and ferment, in a manner similar to an ordinary manure pile, thereby generating carbonic acid gas and causing the acetic acid to evaporate. The acetic acid attacks the Lead, forming, as chemists tell us, basic acetate of Lead, in which condition the Lead will take up carbon from the carbonic acid gas, release the acetic acid and form the carbonate of Lead. After 100 to 120 days the stack is uncovered, and the buckles which went in dull blue lead come out of their grave immaculate in their whiteness. The Lead is then washed to free it from the acetic acid, dried and sold either in that state or ground in oil.

We are indebted to Dutch process corroders for having produced the product that has established White Lead as the best white pigment known. It is their product that has fixed White Lead as the standard by which all other white pigments and White Lead made by all other processes are gauged. For centuries it has stood the test of time and criticism. The Government and commercial bodies of France, having no important Lead mines of their own, have attacked it in vain. Substitutes have been produced, claimed to have special virtues, but one by one have fallen back and found in their lesser market value the verdict of the world as to their respective virtues. White Lead stands to-day as the highest priced white pigment, and substitutes approach it in cost and intrinsic worth in direct proportion to the extent they have supplemented their own defects by the addition of White Lead itself. For all this we are indebted to the Dutch process corroder.

Carter Lead.

Having exhausted my vocabulary in praise of a rival product I hope I will not give offence in saying the Carter Company long since accepted this standard and unhesitatingly undertakes to furnish a better Lead, more uniform in quality, having the same ideal of perfection, produced by more modern and scientific process—the product of American inventive genius. The Carter process does not differ chemically from the Dutch process. It differs in the physical means adopted to bring the chemical agents into contact. The same Pig Lead is used. It is melted, but instead of being run into buckles it is caught by a jet of steam and blown a distance of 35 to 40 ft., falling in a powdered form resembling in size and appearance ordinary gun powder. In this form it is placed in cylinders (2 tons to a charge) that revolve once every 14 min., thus bringing all the small particles of Lead continually in contact with the corroding agencies. The Lead is sprayed with acetic acid and water, by means of which the rapidity of chemical action and temperature are regulated. The carbonic acid gas instead of being made from tanbark is made from coke, which is burned under one of the boilers, the waste product of combustion being used to generate power for the factory. The fumes from the burning coke are conveyed through iron oxide to take out any sulphurous acid gas they may contain. From thence they are conveyed into the cylinders where the corrosion takes place. The Lead is at all times in view of the workman and subject to control, thereby securing complete corrosion and uniformity of product. In 10 days to two weeks the corrosion is complete. The cylinders are then emptied, the product washed, dried and ground, as in the Dutch process.

Recent Criticisms of White Lead.

It has been said that we are incurring much expense and labor for no useful purpose. Expert chemists have recently asserted with great positiveness that acetic acid in the finished product is not injurious, but acts as a drier, and there is no reason whatsoever to go to the large expense of washing the acetic acid out of the lead. In like manner, if the fumes from the coke contains any sulphur whatsoever it is in the form of sulphurous acid gas, which, when brought into contact with the lead, will make lead sulphate, or lead sulphite, or both. These products are both white in color, and are themselves sold to manufacturers of Mixed Paints as white pigments. Sublimed lead and zinc lead are two trade names for these products. Some chemists have pronounced these products as equal or superior to the white lead of commerce. If so, we are incurring a large unnecessary expense in producing carbonic acid gas free from sulphurous gases. But nothing is more conservative than an established business, and until all experts are agreed and time has proved their claims it is safe to say that white lead corroders will not risk the reputation of their brands by experimenting along these lines.

Pulp Ground Lead.

Recently also, we have had chemists criticize White Lead, in that it has an affinity for Oil, claiming that the so-called inert substances that are not affected in any manner when brought into contact with Linseed Oil, are for that reason superior as a pigment. What is meant by "affinity" I can explain best by describing the process by which pulp ground Lead is manufactured. When the White Lead is being washed it is in the state of pulp, weighing 12 to 20 lb. to the gallon. To this pulp is added the necessary amount of refined Linseed Oil. It is then churned much as you churn cream to make butter, and in a little while the Oil and the Lead having what the chemists call an affinity for each other, unite and fall to the bottom of the churn, while the perfectly clear water rises to the top and is drawn off. The Lead in Oil separated in this manner from the water is packed in kegs, in the form with which you are familiar. I had always thought that this affinity between it and Oil was the peculiar virtue of White Lead. Wood unprotected rots. That is to say, the oxygen of the air under normal conditions of heat and moisture has united with the carbon of the wood, forming carbonic acid gas which has disappeared in the air. In process of time, if you weigh the wood you will find it has lost in weight. If you burn it you will find it gives forth less heat units, and a greater percentage of its weight consists in the remaining ash.

What takes place speedily when burned has taken place slowly in the process of decay. If you soak the wood in oil it will keep out moisture and protect the wood for a longer time against the action of the elements, but the oil itself will, in a short time, oxidize, and little by little lose its protective power. If, however, White Lead and Oil is applied the same affinity that makes the Lead leave the water and unite with the Oil in the pulp mill makes the combination resist longer the action of the elements. The fine particles of Lead fill the pores of the wood and protect the Oil while the Oil in turn holds the Lead in place, and the two, indissolubly connected, each supplementing the other, produce a combination superior to either alone and the best protective known.

But "this too shall pass away." Within the sound of Niagara Falls, that for ages has been slowly wearing its way back through the rocks, we are forcibly taught that nothing can resist the action of time and the elements. As long as the Lead and Oil last they do effective work, and when the wood is at last exposed they leave a surface that can easily and cheaply be repainted, without burning or scraping—a virtue possessed by White Lead alone.

Cleveland Screw Companies to Merge.

THE UNION STEEL SCREW COMPANY, Cleveland, Ohio, will be absorbed by the National Screw & Tack Company, Cleveland, provided that action approving the merger, just taken by the directors of the former company, is approved by the shareholders at a meeting called for April 30. Economy in operation and reduction in the cost of production are given as reasons for the proposed merger.

The National Screw & Tack Company is capitalized at $1,000,000 and the Union Steel Screw Company has $542,500 in stock outstanding. The National Company agrees to take over the Union Company for $461,125, payable in 6 per cent. cumulative preferred stock of the former to the par value of $461,000, the stock to be redeemable at any time at the option of the National Company at par and accrued interest. On this basis the holders of the Union Steel Screw stock will realize 85 per cent. for their stock with an income of 5.1 per cent. on the par value of their present holdings. By the terms of the transfer the National Company will take over all the property and business and good will of the Union Company.

The officers of the National Screw & Tack Company are W. D. B. Alexander, president; Dallas Elliott, vice-president; David Auld, Jr., treasurer, and C. W. Brainard, secretary. The officers of the Union Steel Screw Company are W. C. Bruce, president; Alvah S. Chisholm, vice-president, and Gustav von den Steinen, secretary.

North & Judd Mfg. Company's Catalogue.

THE NORTH & JUDD MFG. COMPANY, New Britain, Conn., has issued a new catalogue, No. 81, referring to its large line of Harness Hardware. It is an attarctive and substantially bound volume of 500 pages, conveniently arranged and indexed and handsomely illustrated. Among the more important classes of goods covered are Buckles, Rings, Dees, Halter and Bridle Trimmings, Cockeyes, Trace Hooks, Team and Haine Trimmings, Saddle Trimmings, Snaps and Blanket Hardware, Bits of all kinds, Spurs and Stirrups. The company also issues separate catalogues of Razor Strop Trimmings, Belt Buckles, Baggage Hardware, Automobile Hardware and Belt Trimmings, &c., including Belt Buckles, Fob Buckles and Pendants, &c., in various metals and finishes.

All Steel Factory Chair.

The accompanying cut shows an all metal substitute for a wooden chair with back, to be used in manufacturing plants of all kinds, especially where women are employed or where a chair with a back is required, such as watch, optical, jewelry, typewriter, lamp, hardware factories, &c. These chairs are strongly built and can be subjected to the hardest usage, being designed to meet not only reasonable but unreasonable tests for wear and durability. The legs are of angle iron of heavy stock, securely fastened with strong rivets to the pressed steel seat of good diameter, which is drawn from heavy gauge steel. There are two sets of Bessemer rungs, which make the under structure of this chair extremely rigid. The back rest is made of pressed steel of a heavy gauge, supported by an angle iron standard, securely fastened to the angle iron leg, thus furnishing a strong and comfortable back. The chairs are made in various hights and styles by the Manufacturing Equipment & Engineering Company, 209 Washington street, Boston, Mass.

All Steel Factory Chair.

Hawkeye Refrigerator Basket.

For the use of tourists and outing parties the Burlington Basket Company, Burlington, Iowa, is offering the Hawkeye refrigerator basket, here illustrated. It is represented as a strong light weight basket, made of rattan and fitted up on the inside like a refrigerator. Between the inside metal lining and the rattan body is a layer of felt and asbestos packing, which furnishes effective insulation. There is a small compartment in one end of the basket for holding ice, which may be easily removed for cleaning. The lids and bottom are insulated in the same manner as the body of the basket and all joints are carefully lined, so that when closed the basket is practically airtight. The metal lining is described as rust proof, and the top and bottom are made of hardwood, the lids being polished with oil and the bottom coated with heavy paint to guard against dampness. The basket is provided with handles made of tough wood, securely riveted to the sides. It is furnished on 30 days' trial, the guarantee being that the purchase price will be refunded if found unsatisfactory.

Hawkeye Refrigerator Basket.

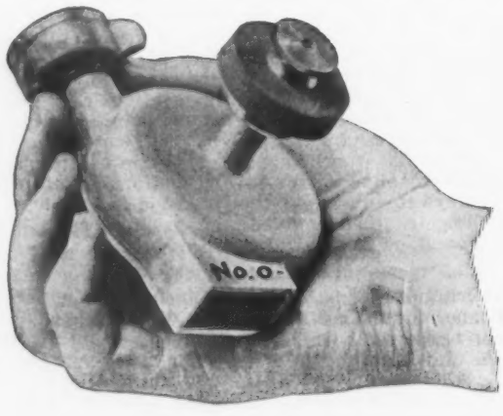
Stall Cleaner.

George S. Prescott, New London, N. H., is manufacturing the combination stable stall cleaner here shown. It includes short fork, hoe and drain cleaner, all in one tool, its use in any form in nowise interfering with the other attachments. The short fork is said to be just the right size and shape to separate bedding from manure so that the bedding is not wasted and will dry quickly. The drain cleaner is strong and hangs at the right angle. The maker states that the tool saves much time, enabling a man to clean a stall perfectly without changing tools or stepping out of his tracks.

Prescott's Stall Cleaner.

The Baby Water Motor No. 0.

A. C. Lippincott, Newark, N. J., is offering the water motor shown herewith. It is only 3 in. outside diameter, has a coupling to fit an ordinary threaded faucet and a 2-in. emery wheel. The emery wheel flange is formed into a small pulley, which with suitable water pressure is said to run a sewing machine or other device requiring equal power. The manufacturer states that under good city water pressure the motor makes nearly 7000 rev. per min., and that it is capable of doing all the grinding



The Baby Water Motor No. 0.

necessary about the house, such as hatchets, carving knives, screw drivers, &c.

The Deck Gravity Level.

The accompanying illustrations give various views of the gravity level put on the market by the T. F. Deck Gravity Level Company, Ohio Building, Toledo, Ohio. The level is simple and durable in construction and so arranged as to automatically indicate horizontal and vertical positions and the angle of any deviation cor-

Fig. 1.—The Deck Gravity Level.

rectly without any adjusting. Fig. 3 shows the interior of the level—A is the pinion; B the multiple gear; C the roller bearings and D the pendulum and weight. As the name implies, the level is operated by the law of gravitation as exemplified in a plumb. The plumb bob or pendulum is suspended from a shaft which rotates in roller bearings. It is explained that this arrangement of the pendulum, shaft and roller bearings produces 75 per cent. more power than is lost by friction, so if one end of

Fig. 2.—Level Graduated Same as Rule or Square.

a 24-in. level stock is raised 1-16 in. the indicator will instantly move 1-16 in. on the graduated dial, which is graduated the same as a rule or square. Fastened on the shaft is a multiple gear wheel of brass, in which are cut 150 teeth, so accurately spaced as not to vary one-half thousandth of an inch. The teeth of this gear wheel mesh in a pinion; to one end of the pinion staff is attached an indicator which points to the graduations on the dial, showing whether the work is level or plumb. A

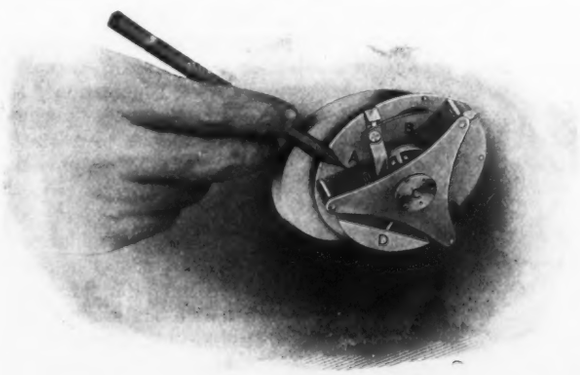
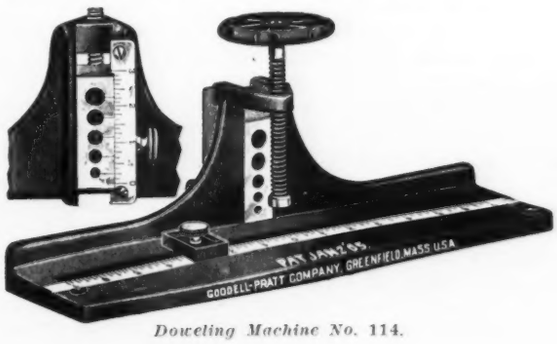


Fig. 3.—Interior of Level Movement.

brake is also provided which operates upon the shaft in such a manner that pressing on the lock button which is on top of the level stock will at once stop the swinging of the pendulum and indicator; while pressing the lock button and giving the button a quarter turn will lock the movement. It is pointed out that notwithstanding the extreme sensitiveness of the instrument, it is wholly practical and extremely durable. The line includes levels for the use of carpenters, masons, millwrights and machinists; also a special level for leveling line shafting and machinery.

Doweling Machine No. 114.

The accompanying illustration represents a doweling machine put on the market by Goodell-Pratt Company, Greenfield, Mass. The machine is designed to make accurate boring of doweling holes possible. Front and rear views are given, showing the graduation by which the hight of the gauge block can be readily determined and

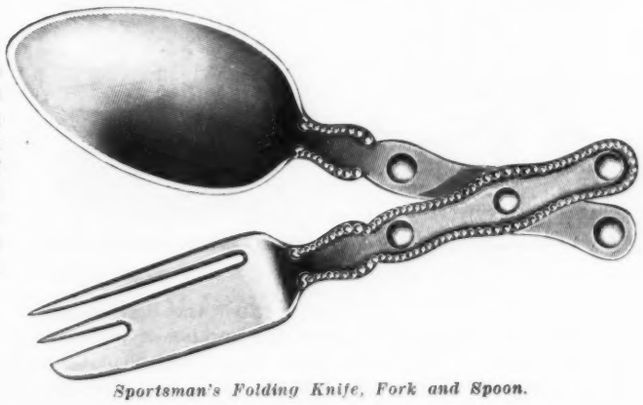


Doweling Machine No. 114.

set at any desired point. The gauge block is provided with holes ¼, 5-16, ⅜, 7-16 and ½ in. in diameter. The face of the machine has a graduated strip running 7 in. in each direction from the center, making possible the location for dowel holes practically perfect. All of the graduated strips are engine divided, and the whole tool is referred to as being well made and attractively finished. The machines are packed, one each in wooden boxes, and thus packed weigh 13½ lb. The net weight of the machine is 10½ lb.

Sportsman's Folding Knife, Fork and Spoon.

The Hart Mfg. Company, Unionville, Conn., is putting on the market the folding knife, fork and spoon shown



Sportsman's Folding Knife, Fork and Spoon.

herewith. It is made in tin plate, nickel silver and silver plate finishes. The device can be carried in the pocket, in a tin pail or in a sportsman's kit.

Bathroom Accessories.

Included in the line of bathroom accessories manufactured by Forsyth Mfg. Company, Buffalo, N. Y., are the match safe and soap tray shown herewith. The match

Match Safe.

Soap Tray.

Bathroom Accessories.

safe is rigidly formed of nickel plated and polished sheet metal, with oval front and a large match holding capacity. The bottom is concaved, which permits the easy

removal of even the last match, and on the underside of the bottom is a match scratcher. The nickel plated and polished soap tray has a specially designed curved bracket with a circular wall plate. The tray is also made with a bracket for attaching to the underside of a shelf.

New Dietz Lanterns.

The R. E. Dietz Company, 60 Laight street, New York, is showing in its new catalogue, No. 40, the New Vesta railroad lantern for kerosene, shown in Fig. 1, which is said to afford a great saving in operating expense over standard railroad lanterns burning signal oil and at the same time giving more light. It burns only 2 6-10 gills of kerosene oil in 18 hr. It is a tubular cold blast lantern, with hinged top. The wick is regulated from the outside, and the oil pot locks in with a bayonet catch and holds oil to burn 16 hr. Another addition to the company's line is the Protector track walkers' lamp, the feature of which is a patent folding bail, permitting it to be carried at arm's length close to the rail. It has a 3-in. ruby semaphore lens in the back, normally covered

Fig. 1. New Vesta Railroad Lantern.

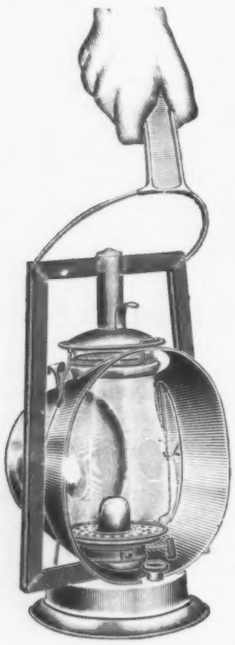


Fig. 2.—Dietz Protector Lamp.

by a slide. When the slide is lifted the light shines through the ruby semaphore lens, forming a powerful danger signal. The lamp has a bright tin hood 6 in. deep, the back of which is formed into a 5-in. reflector. The fount holds oil to burn 20 hr.

Duntley Electric Vacuum Cleaner.

The widespread use of electricty for lighting in dwellings has paved the way for its application to power service in the home as well as the factory. An example of such adaptation is presented in the accompanying illustration, which represents the Duntley electric portable vacuum cleaner, a recent electric appliance developed by the Chicago Pneumatic Tool Company, Chicago. This machine is designed to supplant the broom and dust cloth and other old style means of household cleaning. It consists of a small wooden cabinet, standing 3 ft. high by 2 ft. wide, with a depth of 1 ft. Vacuum is created by a bellows operated by a small electric motor, driven by current from an ordinary lamp socket. All of the mechanical apparatus is contained within the cabinet. The power required to drive the machine is equal to that consumed by four 16 candle power lamps, the cost of which is estimated at 3 to 4 cents per hour. Dust and dirt are drawn up inside of the case through a hose attached by a sleeve joint to a fixture at one end of the machine and are deposited in a dust drawer. The latter is easily removable, and its contents may be safely carried outside for emptying without danger of being scattered about to settle again. The auxiliary tools required for the successful performance of work consist of nozzles with slotted openings and specially designed furniture brushes

Duntley Electric Vacuum Cleaner.

fitted to the operating end of the hose. These when drawn over surfaces to be cleaned suck up the dust, effectually preventing its dissipation through the atmosphere. The entire machine weighs about 70 lb., and is provided with rubber tired rollers and handles, by means of which it is easily portable from room to room.

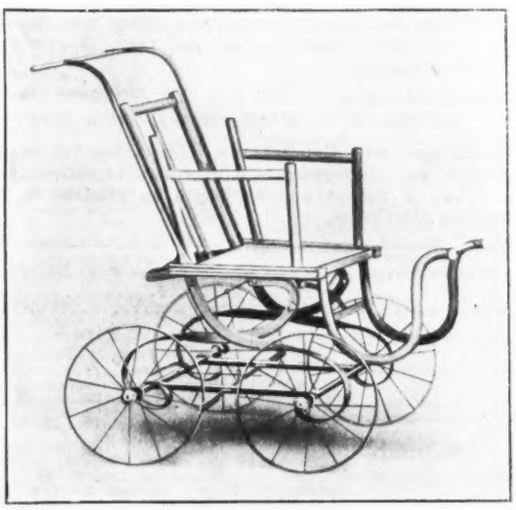
Standard Expansion Pump Bucket.

The Cleveland Galvanizing Works Company, Cleveland, Ohio, manufacturer of pump chain, &c., is making the Standard expansion pump bucket shown in the accompanying illustration. It is a two-piece bucket and expands to 1 13-16 in. diameter. The bulk of rubber at the wearing point is 7-16 in. thick. It is claimed that the rubber cannot strip off the links. There is a strong coarse thread on both rubber and link, making expansion quick and sure. The thread being cast in both members is consequently galvanized over the thread on the links, making a zinc to rubber union, which, it is said, will turn easily, no matter how long in service. The bucket can be expanded at any time without the aid of tools and without removing the bucket from the chain by simply grasping the chain at the point where it joins the links and holding firmly while rotating the rubber on the link with the other hand. The bucket is furnished in standard sizes and in one grade of gum only—the best obtainable, it is stated.

Standard Expansion Pump Bucket.

Steel Vehicle Gears.

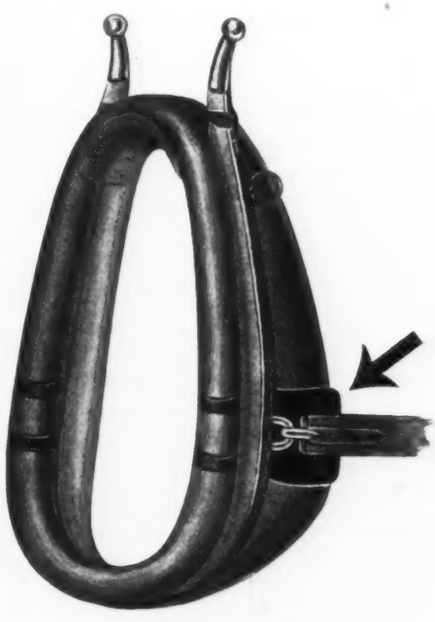
The Wagner Mfg. Company, North Milwaukee, Wis., manufacturer of vehicle hardware, is putting out a line of steel gears for go-carts, baby carriages, folding carts, &c., which are made in a great variety of sizes and adapted to all purposes from the smallest doll carriages to the largest boys' express wagons. The illustration herewith shows reclining folding go-cart equipped with gears made by the company, which makes all of the steel parts used in its construction with the exception of the wheels as a whole. These, however, are furnished with patent stamped steel hubs, which are made in a great variety of sizes and furnished to manufacturers. The construction of the hubs facilitates the assembling of the parts, so that by their use a light, strong wheel can be economically built. Other gears of more elaborate design and heavier construction are also made, with handle bars of ½-in. round steel rods, which may be drilled for regular wood cross bars or furnished with threaded holes for metal grip cross bars. In addition to its line of vehicle gears the company makes a specialty of sheet metal stampings of various kinds to take the place of malleable iron castings.



Steel Vehicle Gears.

Horse Collar Protector.

The Black Diamond Mfg. Company, Cincinnati, Ohio, is manufacturing the horse collar protector herewith illustrated. It is a metal plate having two spring hooks like those used on collar pads. The protector is placed over the collar and under the hames at the point where the traces are fastened to the hames, and prevents the hame tugs and traces breaking down and wearing out the collar. It is not necessary, it is explained, to take the protector off the collar when removing the harness from the horse, or at any other time, but it may be slid up or down on the collar or taken off and put on another collar if desired. The point is made that many collars are thrown away while perfectly good, except where they are worn out or broken down by the hame tugs. The protector is designed to prevent collars wearing out from this cause.



Horse Collar Protector.

Feldmeier & Moore have established themselves in the Hardware business in Grand Junction, Colo.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils— ℔ gal.

Linseed, State and Western, raw, in bbls.	.40 @42
City, Boiled, in bbls.	.44 @45
City, Raw, in bbls.	.43 @44
Raw, Calcutta, in bbls.	.70 @..
Lard, Prime, Winter	.65 @70
Extra No. 1	.55 @57
No. 1	.47 @52
Cotton-seed, Crude, f.o.b. mill	.33 @33½
Summer Yellow, prime	.42 @42½
Summer White	.43¾@44
Yellow Winter	.45¾@46
Tallow, Acidless	.53 @55
Menhaden, Brown, Strained	.40 @..
Light Strained	.40 @..
Northern	@..
Southern	@..
Cocoanut, Ceylon ℔ lb	6⅝@ 6¾
Cochin ℔ lb	8 @ 8¼
Cod, Domestic, Prime	.42 @44
Newfoundland	.44 @46
Red, Elaine	.38 @40
Saponified ℔ lb	5¾@..
Olive, Yellow	.67 @69
Neatsfoot, Prime	.55 @58
Palm, Lagos ℔ lb	6⅛@ 6¼

Mineral Oils—

Black, 29 gravity, 25@30 cold test ℔ gal.	.13 @13½
29 gravity, 15 cold test	.13½@14
Summer	.12½@13
Cylinder, light filtered	.20½@21
Dark, filtered	.18 @19
Paraffine, 903-907 sp. gravity	.14½@15
903 sp. gravity	.13½@14
883 sp. gravity	.11 @11½
Red	.13½@14

Miscellaneous—

Barytes:	
White, Foreign ℔ ton	$18.50@20.50
Amer. floated ℔ ton	19.00@20.00
Off color ℔ ton	13.00@16.50
Chalk, in bulk ℔ ton	3.00@ 3.40
China Clay, Imported ℔ ton	11.50@18.00
Cobalt, Oxide ℔ 100 lb	1.45@ 2.60
Whiting, Commercial ℔ 100 lb	.42@ .52
Gilders ℔ 100 lb	.55@ .60
Ex. Gilders ℔ 100 lb	.60@ .65

Putty, Commercial— ℔ 100 lb

In bladders	$1.70 @1.85
In bbls. or tubs	1.20 @1.45
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine— ℔ gal.

In Oil bbls.	.53 @53½
In machine bbls.	.53½@54

Glue— ℔ lb

Cabinet	.12 @15
Common Bone	7½@ 9
Extra White	.18 @24
Fish, liquid, 50 gal. bbls., per gallon	.60 @1.20
Foot Stock, White	.12 @14
Foot Stock, Brown	9 @11
German Common Hide	.10 @12
German Hide	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.10 @12
Medium White	.14 @17

Gum Shellac— ℔ lb

Bleached, Commercial	.20 @22
Bone Dry	.25 @27
Button	.40 @50
Diamond I.	.47 @48
Fine Orange	.29 @32
A. C. Garnet	.23 @24
G. A. L.	.18 @19
Kala Button	.17 @18
D. C.	.48 @49
Octagon B.	.38 @40
T. N.	.21 @23
V. S. O.	.47 @48

Colors in Oil— ℔ lb

Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.12 @16
Green, Paris	@24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White Lead, Zinc, &c.— ℔ lb

Lead, English white, in Oil	.10⅛@10⅝
Lead, American White:	
Lots of 500 lb or over, in Oil	@ 6¾
Lots less than 500 lb, in Oil	@ 7¼
Lead, White, in oil, 25 lb tin pails	@ 7¼
Lead, White, in oil, 12½ lb tin pails	@ 7¾
Lead, White, in oil, 1 to 5 lb assorted tins	@ 8¾

Lead, American. Terms: On lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice.

Zinc, Dry— ℔ lb

American, dry	5⅛@ 5⅝
Red Seal (French process)	6¾@ 7
Green Seal (French process)	7⅛@ 7½
German Red Seal (French process)	6⅝@ 7
Green Seal	7¼@ 7⅝
White Seal	7⅞@ 8¼
French, Red Seal	8¼@ 8¾
Green Seal	10⅛@10⅝

Dry Colors— ℔ lb

Black, Carbon	6¼@10
Black Drop, American	3½@ 8
Black Drop, English	5 @15
Black, Ivory	.16 @20
Lamp, commercial	4 @ 6
Blue, Celestial	4 @ 6
Blue, Chinese	.31 @33
Blue, Prussian	.29 @31
Blue, Ultramarine	3½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.10@3.25
Green, Chrome, ordinary	3½@ 5
Green, Chrome, pure	.17 @25
Lead, Red, bbls., ½ bbls., kegs.	@ 6¾
Litharge, bbls., ½ bbls., kegs.	@ 6¾
Ocher, American ℔ ton	$8.50@16.00
American Golden	2½@ 3¼
French	1¼@ 2
Foreign Golden	3 @ 4
Orange Mineral, English	.10 @11
French	12¾@13
German	.10 @11
American	8½@ 8¾
Red, Indian, English	4½@ 6
American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer. ℔ 100 lb	$0.50@1.25
English ℔ 100 lb	$1.15@1.60
Sienna, Italian, Burnt and Powdered	3 @ 9
Italian, Raw Powdered	3 @ 7
American, Raw	1¼@ 2
American Burnt and Pow'd.	1¼@ 2
Talc, French ℔ ton	$18.00@25.00
American ℔ ton	15.00@25.00
Terra Alba, French ℔ 100 lb	.90@ 1.00
English ℔ 100 lb	.80@ 1.00
American ℔ 100 lb, No. 1	.75@ .80
American ℔ 100 lb, No. 2	.60@ .85
Umber, T'key, Bnt. & Pow.	2¾@ 3
Turkey, Raw and Powdered	2¾@ 3
Burnt, American	1½@ 2
Raw, American	1½@ 2
Yellow Chrome, Pure	.13 @15
Vermilion, American Lead	.7 @25
Quicksilver, bulk	.65 @..
Quicksilver, bags	@65
English, Imported	.65 @70
Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ₰ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₰ doz. pairs .....$2.00@$3.00

Anvils—American—

Eagle Anvils.....₰ lb @8½¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....₰ lb 9½@9¾¢

Imported—

Swedish Solid Steel Sisco, Superior, ₰ lb.....10@10½¢
Peter Wright & Sons, ₰ lb, 84 to 349 lb. 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co.....10%

Augers and Bits—

Com. Double Spur....75&10@80%
Jennings' Pats., Bright, 65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25&7½%
No. 30, R. Jennings' list.....50%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....40%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....40%
Snell's Bell Hangers' Bits.....40%
Snell's Car Bits, 12-in. twist.....40%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's Pattern, No. 1, ₰ doz. $28; No. 2, $18.....60&10%
Ford's, Clark's Pattern.....66⅔&5%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz..$6.50@7.00
Ames .....25&10%
Universal 20%

Ship Augers and Bits—

Ship Augers.....40&10@—%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shidered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. $1@3.50
Unhdled, Shidered..gro. 65@70¢
Scratch Awls.
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights: Per doz.
First Quality.....$4.75&5.00
Second Quality.....$3.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—

See *Grease, Axle*

Axles—Iron or Steel

Concord, Loose Collar..4½@5 ¢
Concord, Solid Collar..4¾@5¼¢
No. 1 Common, Loose....3¾@4¼¢
No. 1½ Com., New Style..4½@5 ¢
No. 2 Solid Collar.....4½@5 ¢
Half Patent:
Nos. 7, 8, 11 and 12..65@65&10%
Nos. 13 to 14.....65@65&10%
Nos. 15 to 18.....70@70&10%
Nos. 19 to 22.....70@70&10%

Boxes, Axle—

Common and Concord, not turned lb., 5@6¢
Common and Concord, turned. lb., 6@7¢
Half Patent.....lb., 9½@10¢

Bait—Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—

Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50@50&10%
Straight Balances.....40@40&10%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb.... per lb., —@2½@2¾¢

Towel—

No. 10 Ideal, Nickel Plate..₰ gro. $8.50

Beams, Scale—

Scale Beams.....40%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₰ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₰ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....₰ doz. $1.50

Beaters, Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $28.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.50

Bellows—

Blacksmith, Standard List..
Split Leather.....60&10@65%
Grain Leather.....50@50&10%

Hand—

Inch..	*6*	*7*	*8*	*9*	*10*
Doz..	*$5.00*	*5.50*	*6.00*	*6.50*	*7.50*

Molders—

Inch..	*10*	*12*	*14*	*16*
Doz..	*$7.50*	*9.00*	*12.00*	*15.00*

Net Prices.

Bells—Cow—

Ordinary Goods...75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....35&10%

Hand—

Polished, Brass.....50&10@60%
White Metal....50&10@50&10&5%
Nickel Plated.....50&5%
Swiss .....50&5%
Cone's Globe Hand Bells.....33⅓@35%

Miscellaneous—

Farm Bells.....lb., 2¼@2½¢
Church and School....60@60&5%

Belting—Leather—

Standard .....70&10@70&10&5%
Light .....75&10%
Cut Leather Lacing...50&10@60%
Leather Lacing Sides, per sq. ft. 21@22¢

Rubber—

Competition (Low Grade), 70&10@75&5%
Standard .....60@60&10%
Best Grades.....33⅓@40&10%

Bench Stops—

See *Stops, Bench*

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list: Chain, Parts, Spokes.....50%
Tubes 40%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—Tackle—

Common Wooden.....75@75&5%
B. & L. B, Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....55%
Embossed 55%

Boards, Wash—

See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅝ × 6 and smaller.....75@—%
Larger and longer.....70@—%
Phila. Eagle, $3.00 list...80@—%
Bolt Ends.....70@—%
Machine (Cut Thread):
⅜ × 4 and smaller...75&5@—%
Larger and longer.....70@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch....	*3*	*4*	*5*	*6*	*8*
Per doz..	*$0.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:

Inch.....	*6*	*8*	*10*
Per doz.....	*$1.20*	*1.50*	*2.25*

Cast Iron Chain, Flat, Japanned:

Inch.....	*6*	*8*	*10*
Per doz.....	*$1.00*	*1.40*	*1.65*

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.75*	*.85*	*1.25*

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square .....70&10&10%
Ives' Patent Door.....55%
Ives' Wrought Metal.....45%

Expansion—

Richards Mfg. Co.....50&10%
Steward & Romaine Mfg. Co.
Style No. 13, Double.....55%
Style No. 1, Single.....55%
Style No. 100, Dbl. Jaw, Single..50%
Lag Screw.....66⅔%

Plow and Stove—

Plow .....65&5@70%
Stove .....85@85&5%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Bung—

Borers Bung, Ring, with Handle:

Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz....	*$4.80*	*5.60*	*6.40*	*8.00*
Inch	*2¼*			*2½*
Per doz.....	*$8.65*			*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Seavey 45%

Braces—

Common Ball, American....$1.50
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat..60&10%

Brackets—

Wrought Steel.....70&10@75&10%
Bradley Metal Clasp..80&10@80&10&5%
Griffin's Pressed Steel.....75@75&10%
Griffin's Folding Brackets.....70&10%
Taplin Victor Handy Egg Beater Bracket .....₰ doz. $1.50

Bright Wire Goods—

See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co.....75&20%
Wire Goods Co.....75%

Buckets, Galvanized—

M'f'gr's list, price per gross.

	Quart..	*10*	*12*	*14*	
Water, Reg...		*25.35*	*28.00*	*32.00*	*1045%*
Water, Hvy...		*45.35*	*48.00*	*52.00*	
Fire, Rd. Btm.		*32.00*	*34.65*	*38.65*	
Well		*37.35*	*41.35*	*45.35*	

Bull Rings—See *Rings, Bull*

Butts—Brass—

Wrought, High List, Oct. 26, '06..65%
Cast Brass, Tiebout's.....40%

Cast Iron—

Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—

Bright.
Light Narrow, Light Reversible .....70&5%
Reversible and Broad..70&5%
Loose Joint, Narrow, Light Inside Blind, &c.....70%
Back Flaps, Table Chest..65% Japanned.
Light Narrow, Loose Pin. 40&5&
Light Narrow, Ball Tip..60%
Broad .....40&5%
Steeple Tipped.....70%
Ball Tipped.....70%

Extra 10—

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze; Series 700, 800..30%
Hendryx Enameled 35%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4¼@4¾¢
Sharp, 1 prong, per lb., 4¾@5¼¢
Burke's, Blunt, 4@4¾¢; Sharp, 4½@5¼¢
Lautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ₩ lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Caps, Percussion—

Eley's E. B ..... 58@55¢
G. D ..... *per M* 34@35¢
F. L ..... *per M* 40@42¢
G. E ..... *per M* 48@50¢
Musket ..... *per M* 62@63¢

Primers—

Berdan Primers, #2 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M.$1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges:
32 C. F., $5.50 ..... 10&5%
38 C. F., $7.00 ..... 10&5%
22 cal. Rim, $1.50 ..... 10&5%
32 cal. Rim, $2.75 ..... 10&5%
B. B. Caps, Can. Ball, Sieyd. $1.90
B. B. Caps, Round Ball *$1.49*
Central Fire 25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting 50%
Rim Fire, Military ..... 15&5%

Casters—

Bed ..... 65&10%
Plate ..... 60&5%
Philadelphia ..... 70&10%
Acme, Ball Bearing 35%
Gem (Roller Bearing) .....70&10&10&5%
Steel Gem 20%
Standard Ball Bearing 45%
Yale (Double Wheel) low list..40&10%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

3-16	¼	*5-16*	⅜	*7-16*	½	⅝
$8.15	5.55	4.60	3.95	3.75	3.65	3.55

¾-⅞-1 1⅛ to 1¼ inch.
$3.45 3.55
In cask lots, deduct 25¢.
German Coil ..... 60@60&5%
German Pattern Coil:
6-9 to 1 ..... 70&5@70&10%
2 and 3..60&10&10@60&10&10&5%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains ..... 60@60&5%
German Pattern Halter Chains, list July 24, '97 ..... 60&10&5%
Covert Mfg. Co.
Halter ..... 35&3%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$28.00
6½—6-2, Straight, with ring..$29.00
6½—8-2, Straight, with ring..$32.00
6½—10-2, Str'ght, with ring..$37.00
NOTE.—Add 2c per pair for Hooks Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link
Eastern Standard Traces, Wagon Chain, &c..60&10@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron ..... 60&10%
Brass 60%
Safety and Plumbers' Chain, 60&10%
Gal. Pump Chain....lb., 4½@5%
Bridgeport Chain Co.:
Triumph Halter and Coil..35&2½@40%
Triumph Dog ..... 50&10@60%
Brown Halter and Coil.....45@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains ..... 35&2½@40%
Niagara Dog Leads and Kennel Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain 70%
Universal Dbl.-Jointed Chain..... 50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain 60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set..8¢

Chalk—(From Jobbers.)

Carpenters' Blue....gro., 50@55¢
Carpenters' Red.....gro., 45@50¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's 45%
Pullman, per gro $54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....50%
Youths' Chests, with Tools.....25%
Gentlemen's Chests, with Tools...25%
Farmers', Carpenters,' etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty 45%
Tool Cabinets 45%
C. E. Jennings & Co.'s Machinists Tool Chests 7½%

Chisels—

Socket Framing and Firmer

Standard List ..... 80&10@—%
Buck Bros. 30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No. 15.....25&7½%
Swan's ..... 66⅔@70%
L. & I. J. White Co.....30@30&5%

Tanged—

Tanged Firmers.....80&5@35%
Buck Bros. 30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co..... 25&5%

Cold— *lb.*

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary... 9@10¢

Chucks—

Almond Drill Chucks 35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each $8.00.....35&5%
Empire 25%
Blacksmiths' 25%
Jacobs' Drill Chucks 35%
Pratt's Positive Drive 25%
Skinner Patent Chucks:
Independent Lathe Chucks.....35%
Universal, Reversible Jaws.....35%
Combination, Reversible Jaws....35%
Drill Chucks, New Model, 25%; Standard, 45%; Skinner Pat., 25%; Positive Drive 40%
Planer Chucks 20%
Face Plate Jaws 35%
Standard Tool Co.:
Improved Drill Chuck 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 83 and 84 ..... 30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318..35%
Independent Steel, No. 64..... 25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104..... 35%
Union Czar Drill 25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal, No. 42..... 35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50 ..... 35%
Steel Face Plate Jaws, Nos. 70 and 72 ..... 30%
Westcott Patent Chucks:
Lathe Chucks 50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill 50%
Scroll Combination Lathe.....50%
Whitaker Mfg. Co.:
National Drill 25%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co. ..... 50&10%
Besly, Parallel ..... 33⅓&10%
Myers' Hay Rack 45%
Lineman's Swedish Neverturn.....65%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel..₩ doz. $4.05 net
Star Shank, All Steel..₩ doz. $3.24 net
W. & C. Shank, All Steel, ₩ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros. 30%
Fayette R. Plumb 30%
L. & I. J. White Co..... 30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each..$20.00
Stewart's Enclosed Gear Horse, each..... $8.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} See Net

Clips, Axle—

Regular Styles, list July 1, '05, 80&80&10%

Cloth and Netting, Wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c. ..... 70@—%
Compression Bibbs..60&10@—%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list 40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Wm. Schollhorn Co.:
Excelsior Dividers 60%
Lodi Dividers ..... 70&10%

Conductor Pipe,—

	Gal. Steel.	*Charcoal.*
	L. C. L. to Dealers:	
Eastern	....70&10%	50&10&2½%
Pittsburgh	..75&10&5%	60%
Central	....75&10%	6 %
Northwestern,	75&7½%	60%
Western	...70&12½%	5%&12½%
Tennessee	..70&10%	50&12½%
Southern	... 70%	50&12½%
Southwestern,	70%	50&5%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90

Galvanized, Lined, side handles,

Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled 10%
Agate Lined 10%

Coopers' Tools—

See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 22@25¢; lighter than 3 lb. to pair.....24@27¢

Cord— Sash—

Braided, Drab ..... *lb.* 35¢
Braided, White, Com., Nos. 8 to 12, 23¢; No. 7, 23½¢; No. 6, 24½¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India..... *lb.*, 11@11½¢
*Cotton Sash Cord, Tw'ted.*18@20¢
Patent Russia ..... *lb*... 20¢
Cable Laid Russia ..... *lb*... 21¢
India Hemp, Br'd'd ..... *lb*... 21¢
India Hemp, Twisted..*lb.*13@14½¢
Patent India, Twisted... *lb*... 17¢
Pearl Braided, cotton, No. 6, ₩ lb, 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½¢; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10 ..... ₩ lb 23 ¢
Pullman:
Wire Sash Cord 10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ₩ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White....₩ lb 40¢
Massachusetts, Drab....₩ lb 45¢
Phoenix, White, Nos. 8 to 12, 27¢;
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp 40¢; Linen....57½¢
See also Chain and Ribbon.
} See Net

Wire, Picture—

List July 10, 1906 ..... 90@—%
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord ..... 85&10%

Cradles—

Grain ..... 40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber. ₩ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $5.50; Light $5.00

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden 50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ₩ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ₩ doz. $3.00
Wm. Rogers & Son..... ₩ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co. 40%
Red Devil 60%
B. Mfg. Co. 40%
Woodward 50%

Meat and Food—

American 30%
Nos. 401 402 403 404 405 406 407
Each .. $5 $7 $10 $12 $25 $50 $60
Enterprise:
Nos.... 5 10 12 22 32
Each .. $2 $3 $2.75 $4.50 $6 25@25&7½%
No. 202, $1.50 ..... 40&7½%
P., S. & W. Co.:
Dixon's ..... ₩ doz. 33⅓%
Nos... 1 2 3 4
$14.00 $17.00 $19.00 $30.00
Ideal ..... 40@40&5%
Hales ..... 60&10&5%
Little Giant..... ₩ doz. 40@50%
Nos.. 305 310 312 320 322
$35.00 $48.00 $44.00 $72.00 $68.00
New Triumph No. 605, ₩ doz. $24.00. 40&10%
Russwin Food. No. 1, $24.00; No. 2, $27.00 ..... 45&10&10%
$15.00 $18.00
Enterprise Beef Shavers..... 25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters 30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₩ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ₩ doz. $4.00

Tobacco—

All Iron, Cheap..doz. $1.25@$1.50
Enterprise ..... 25@30%
National, ₩ doz., No. 1, $21; No. 2, $18 ..... 40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ₩ doz., $24.00 ..... 25%
Samson, ₩ doz., $34.00 ..... 25%
Iwan's Improved Post Hole Auger..40%
Vaughan Pattern Post Hole Augers, ₩ doz., $7.00
Perfection Post Hole Diggers, ₩ doz. $8.75
Split Handle Post Hole Diggers, ₩ doz., $7.75
Hercules Pattern, ₩ doz.....$10.00
Kohler's, ₩ doz., Universal, $15.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer.....$7.50
Never-Break Post Hole Diggers, ₩ doz., $24.00 ..... 60%

Dividers—See *Compasses.*

Drawing Knives—

See *Knives, Drawing.*

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines ..... *$1.50@$1.75*
Breast, Millers Falls.....
Breast, P., S. & W. 33⅓%
Goodell Automatic Drills..50&10@60&10%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis 25%
Ratchet, Parker's 40%
Ratchet, Weston's 40%
Ratchet, Weston's, Style H Improved 40%
Ratchet, No. 012 ..... 40%
Ratchet, Celebrated 40%
Ratchet, Whitney's, P., S. & W., 50&5%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00..... 33⅓%

Twist Drills—

Bit Stock ..... 70@70&5%
Taper and Straight Sh 60&10@70%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ₩ doz., 2½-in., $6; 4-in., $7.50; 6-in., ₩ 50%
Buck Bros.' Screw Driver Bits.....30%
Champion 50%
Disston's 70%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto. .....65@65&10%
Mayhew's Black Handle 40%
Mayhew's Monarch 40%
Millers Falls, Nos. 20 and 21 ...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Smith & Hemenway Co., Neverturn, 66⅔%; Elmora, 60%; Star, 30&10%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*Gal. Steel.*	*Charcoal Iron.*
Eastern	....75&10&5%	60&20%
Pittsburgh	.80&20%	65&10%
Central	...80&10&10&2½%	65&10%
Northwestern	80&10&10%	65&10%
Western	....80&10%	60&10&5%
Tennessee	..80&5%	60&10&5%
Southern	.. 80%	60&10&5%
Southwestern	75&10&2½%	60&5%

Terms.—2% for cash. Factory shipments generally delivered.
Note.—Lower prices are made in some sections.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I. Standard Gauge....85@85&10%
No. 26 ..... 50%
No. 24 ..... 25%
No. 22 ..... 10%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40&10&10%
Edwards, Royal Blue.....40&10&10%
Reeves, Dover, one piece.....40&10%

Emery, Turkish—

	¼ to ½:	*½ to 2:*	*Flour.*
Kegs ..... *lb.*	5 ¢	5½ ¢	5½ ¢
½ Kegs.... *lb.*	5½ ¢	5¾ ¢	5¾ ¢
¼ Kegs..... *lb.*	5½ ¢	5¾ ¢	6 ¢
10-lb. cans, 10 in case....	6½ ¢	7 ¢	8 ¢
10-lb. cans, less than 10.....	10 ¢	10 ¢	8 ¢
Less quantity	10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's ..... 50&10%
Walling's ..... 40&10%
Upson's Patent 40%

Cord and Weight—
Ives and Titan 33⅓%

Corrugated—
Acme Corrugated Fasteners 70%

Faucets—
Cork Lined ..... 50&10@60%
Metallic Key, Leather Lined, 60&10@70%
Red Cedar ..... 40&5@40&10&5%
Petroleum ..... 70&10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&5%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Mtl. Key ..... 50&10%
John Sommer's Duplex Metal Key 60%
John Sommer's Diamond Lock 40%
John Sommer's I.X.L. Cork Lined 50%
John Sommer's Reliable Cork Lined ..... 50&10%
John Sommer's Chicago Cork Lined 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection, Cedar 40%
Self Measuring:
Enterprise, ℔ doz. $36.00 ..... 40&10%
Lane's, ℔ doz. $36.00 ..... 40&10%
National Measuring, ℔ doz. $36.40 ..... 40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands ..... 70&10@75&10%
Standard Brands ..... 75&10@80%
Lower Grade ..... 75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97 ..... 33 1-3@40%

Fixtures, Fire Door—
Allith Underwriters' Approved 50%
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 ..... $3.75
Fusible Links, No. 96 ..... 60%
Expansion Bolts, No. 107 ..... 40&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

P., S. & W. Co. 25%
Reading Hardware Co. 60%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato ..... 60&10%
Victor, Hay ..... 60&15&
Victor, Manure 66⅔%
Victor, Header 65%
Champion, Hay 66⅔%
Champion, Header 65%
Champion, Manure ..... 60&15&2½%
Columbia, Hay ..... 60&20%
Columbia, Manure 70%
Columbia, Spading ..... 70&12½%
Hawkeye Wood Barley 40%
W. & C. Potato Digger ..... 60&10%
Acme Hay ..... 60&20%
Acme Manure, 4 tine ..... 60&10&5%
Dakota Header ..... 60&20%
Jackson Steel Barley ..... 60&20%
Kansas Header 65%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Wood Saw—
White, S'g't Bar, per doz. 75@80¢
Red, S'g't Bar, per doz. $1.00@1.25
Red, Dbl. Brace, per doz. $1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped .. 3.65
Waterproof Dbl. Taped .. 4.40
Waterproof Tpl. Taped .. 5.15
} 10&5%

Gates, Molasses and Oil—
Stebbins' Pattern ..... 80@80&5%

Gauges—
Marking, Mortise, &c. 50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. ..... 50&50&10%
Disston's Marking, Mortise, &c. .. 67½%
Wire, Brown & Sharpe's 33⅓%
Wire, Morse's 25%
Wire, P., S. & W. Co. 33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1. $2.00; 2. $2.50
Spike, Metal, No. 1. $4.00; 2. $4.50
Nail, Wood Handled, No. 1, $2.50; 2. $2.60
Spike, Wood Handled, No. 1, $4.50; 2. $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co. ..... 65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush .. 25&10@50%
Elwell's 40%

Grease, Axle—
Common Grade ....gro. $6.00@6.50
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ℔ doz., 1 lb. $1.20; 2 lb. $2.00
Helmet Hard Oil 25%

Griddles, Soapstone—
Pike Mfg. Co. ..... 33⅓@33⅓&10%

Grinders—
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 ..... 30%
Alundum Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50 ..... 30%
Alundum Disc Grinders, each, $2.50 ..... 30%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ℔ inch, ℔ doz., $2.00 ..... 33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted 40%

Grips, Nipple—
Perfect Nipple Grips ..... 40&10&2%

Halters and Ties—
Cow Ties ..... 60&5@60&10%
Bridgeport Chain Co.:
Triumph Coil and Halters. 35&2½@40%
Brown Coil and Halters ... 45@50&5%
Brown Cow Ties ..... 50&5@50&10&5%
Brown Tie Outs ..... 70&10@75&5%
Covert Mfg. Co.:
Web ..... 30&2%
Jute Rope 35%
Sisal Rope 20%
Cotton Rope 45%
Hemp Rope 48%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45@50%
Niagara Coil and Halters .. 45@50&5%
Niagara Cow Ties .... 45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists' ... 55&10@55&10&5%
Heller's Farriers' ..... 40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel 50%
Farriers' ..... 40&10&5%
Riveting 50%
Machinists', revised list ..... 66⅔&5%
Blacksmiths' ..... 50&5%
Fayette R. Plumb:
A. E. Nail ..... 40&2½@40&12½%
Eng. and B. S. Hand. 50&10&5@60&5%
Machinists' Hammers ..... 60@60&10%
Rivet and Tinners'. 40&7½@40&12½&5%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢ ... 80&10%
3 to 5 lb., per lb. 40¢ ..... 80&10%
Over 5 lb., per lb., 30¢ .....
Over 5 lb., per lb., 30¢ . 80&10&10%

Handles—
Agricultural Tool Handles
Axe, Pick, &c. .... 60&10@60&10&5%
Hoe, Rake, &c. 40%
Fork, Shovel, Spade, &c.:
Long Handles 40%
D Handles 40%

Cross-Cut Saw Handles—
Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted ... gro. $3.00@$3.50
Brad Awl ..... gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory ..... $2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; Hickory .... $1.60@$1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted ..... gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished ... 65@75¢
Plane Handles:
Jack, doz. .30¢; Fore, doz. .45¢.
Chapin-Stephens Co.:
Carving Tool ..... 30@30&10%
Chisel ..... 60@60&10%
File and Awl ..... 60@60&10%
Saw and Plane ..... 30@30&10%
Screw Driver ..... 30@30&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 15&10%
Nicholson Simplicity File Handle .... ℔ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool, ℔ gro., No. 1, $8.00; No. 2, $8.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00 ..... gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ℔ doz. 12 in. $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in. $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ℔ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ℔ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ℔ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ℔ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ℔ doz., 12 to 14 in., $2.00.
} 30&5%

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.
Allith Mfg. Co.:
Reliable, Nos. 1 and 2; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
} Extra 10&10% often given.
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle ..... 60&2½%
Roller Bearing ..... 70&2½%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00 .. 60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy. No. 22, $18.00 ..... 60&10%
Bull Dog, $24.00 ..... 70%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard ..... 60&10%
Hinged ..... net $6.08
Covered ..... 60&5%
Special ..... 10&5%
Lawrence Bros.:
Advance ..... 55&10%
Cleveland ..... 70&7½%
Clipper, No. 75 ..... 60%
Crown ..... 55&10%
Cyclone, No. 40 ..... net $6.50
Tandem, No. 50 ..... net $7.50
New York ..... 55&10%
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2. 70%
Anti-Friction 60%
Hinged Hangers, King Charm. 60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3. $2.25
Roller B'r'g St'l Track No. 12. $2.20
Roller B'r'g St'l Track No. 13. $2.50
Roller B'r'g, Nos. 39, 41, 45, 70&7½%
Hero, Adj. Track No. 19. 50&10%
Adjustable Track Tandem Trolley Track No. 16 ..... 50&10%
Seal, Steel Track No. 8 ..... $2.25
Auto Adj. Track No. 22.—50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150 ..... $2.50
Safety Underwriters F. D. No. 101 ..... 50%
Tandem No. 41. 2½ and 3 60&10%
Palace, Adjustable Track No. 132 ..... 50&5%
Royal, Adjustable Track No. 122 ..... 50&10%
Ives' Wood Track No. 1 ..... $2.25
Trolley B. D. No. 20 ..... 50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28 ..... $1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2. 70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3 ..... 60%
Hinged Tandem No. 48 ..... 50&5%
Folding Door B. B. Swivel No. 135 ..... 40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing. 50&15&10&5%
Myers' Stayon Hangers 60%

Hangers— Garment—
Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $3.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro. $10.50
Victor Folding ..... ℔ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ℔ doz. net $4.80

Joist and Timber—
Lane Bros. Co. 30%

Hasps—
Griffin's Security Hasp ..... 50&10%
McKinney's Perfect Hasp, ℔ doz. .60%

Hatchets—
Regular list, first qual. 40&2½@—
Second quality ..... 50&5@—

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5D, $2.00; No. 3, $2.25; No. 3D $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50 ..... 25%
Clark Coal, ℔ doz., $0.75 ..... 20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Acme, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures. No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Charles Parker Co. ..... 70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00 ..... 20%
Reading's Gravity 60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ℔ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter ..... 75&5%
Acme, Lull & Porter 75%
Queen City Reversible 75%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75&5%
Tip Pat'n, No. 1 ..... 75&10%
No. 3 ..... 75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 70&10&5%
Shepard's Double Locking 75%
Champion Gravity Locking ..... 75&5%
Pioneer ..... 75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.85*

New England:
With Latch ..... doz. ... @$2.00
Without Latch ... doz. ... @$1.60
Reversible Self-Closing:
With Latch ..... doz. ... @$1.75
Without Latch ... doz. ... @$1.35
Western:
With Latch ..... doz. $1.75
Without Latch ..... doz. $1.15
Wrightsville Hardware Co.: Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3 ..... 70%

Pivot Hinges—
Bommer Bros. Pivot 40%
Lawson Mfg. Co. Matchless 50%

Spring Hinges—
Holdback, Cast Iron ... $6.75@$7.00
Non-Holdback, Cast Iron $6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges 40%
Bardsley's Patent Checking. 33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor. 40%
Bommer Spring Hinges 40%
No. 999 Wrot. Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor. 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hardware Co.:
Acme, Wrought Steel 30%
Acme, Brass 25%
American 30%
Columbia, ℔ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ℔ gr. $12.00
Columbian Hinges ..... 60&10%
Gem, new list 30%
Clover Leaf ..... ℔ gr. $12.00
Oxford, new list 30%
Floor Spring Hinges ..... 65&10%
Lawson Mfg. Co., Matchless 30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door ..... ℔ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door 25%
No. 777, Sheet Steel Holdb'k, ℔ gr. pr. $9.00
Standard Mfg. Co.:
Champion Double Acting Door Hinge ..... 25&10&10%
Standard Double Acting Floor Hinge ..... 25&10&10%
Superior Spring Hinge Co.:
Superior Floor Hinges 33⅓%
} Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges .. 50&10%
Heavy Strap Hinges .. 60&5%
Light T Hinges 50%
Heavy T Hinges 40%
Extra Hvy. T Hinges. 50&10%
Hinge Hasps 33⅓%
Cor. Heavy Strap ... 60&5%
Cor. Ex. Heavy T ... 50&10%
} Extra 10&7½%.

Screw Hook and strap. { *6 to 12 in. .lb. 3½¢* / *1½ to 20 in. .lb. 3½¢* / *22 to 36 in. .lb. 3 ¢* }

Screw Hook and Eye:
¾ to 1 inch ..... lb. 6½¢
⅝-inch ..... lb. 7½¢
½-inch ..... lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers .. 30&2%

Hods— Coal—
M'f'gr's list, price per gross.

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$42*	*$46*
Jap. Open	*26*	*28*	*31*	*35*
Galv. Funnel	*48*	*48*	*52*	*56*
Jap. Funnel	*33*	*36*	*39*	*43*

} 10&5%

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162 ..... each $1.05
Steel Mortar, No. 158 ..... each $1.35

Hoes— Eye—
Scovil and Oval Pattern ..... 60&10@60&10&10%
Grub, list Feb. 23, 1899 ..... 70&10@70&10&10%

D. & H. Scovil.....27½%
Am. Fork & Hoe Co. (Scovil Pattern).....60%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 40&5%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz., 60&10%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B, B, 6 in., Cultivator Hoe.....$3.40
B, B., 6½ in.....$3.50
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₱doz.$5.25

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders—Bit—

Angular, ₱ doz. $24.00.....45&10%

Door—

Bardsley's, Iron, 40%; Brass and Bronze.....25%
Empire.....50%
Pullman.....35%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip.....50%
Superior.....33⅓%

File and Tool—

Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—

Triumph Fruit Jar Holder, ₱ gross, $10.80; ₱ doz.....$1.25

Trace and Rein—

Fernald Double Trace Holder, ₱ doz. pairs.....$1.25
Dash Rein Holder, ₱ doz. pairs..$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Coat and Hat, Reading.....45&20%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....40%

Wire—

Belt.....80%
Wire C. H. Hooks..75&10@—%
Bradley Metal Clasp Wire, Coat and Hat, 70&10%; Ceiling.....70&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Hush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz.$3.00
Grass, common grades, all sizes, per doz.....*$1.50*
Whiffletrees.....*lb.*5¾@6¢
Hooks and Eyes:
Brass.....60@60&10%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder.....80&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....*ft. 5@ 6¢*
3 ply Guaranteed.....*ft. 8@ 9¢*
4 ply Guaranteed.....*ft.10@11¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8@ 9¢*
Fair Quality.....*ft.10@11¢*

Irons—Sad—

From 4 to 10.....*lb. 3@3½¢*
B. B. Sad Irons.....*lb.*3½@3½¢
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Tops	83	80	93	91
Tin'd Tops	88	85	98	95

New England Pressing..*lb.*3½@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner.....60%

Pinking—

Pinking Irons.....*doz.80¢*

Irons, Soldering

See *Copiers*

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Ladder—

Richards Mfg. Co., Ladder Jacks..50%

Kettles—

Brass, Spun, Plain.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....*80&10&10%*
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's.....66⅔@70%
Watrous.....16⅔
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz. $5.50@5.75
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Miscellaneous—

Farriers'.....*doz. $2.60@3.55*
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro. $1.25@$1.40*
Carriage, Jap., all sizes.....*gro. 40@45¢*
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....20%
P. S. & W.....40&10%
Reading.....60%

Lanterns—Tubular—

Regular, No. 0.....*doz.$4.35@4.50*
Side Lift, No. 0.....*doz.$4.60@4.75*
Hinge Globe, No. 0..*doz.$4.60@4.75*
Other Styles.....*40@40&10%*

Bull's Eye Police—

3-inch.....*$4.25@4.50*

Latches—Thumb—

Roggin's Latches, with screw..*doz. 35@40¢*

Door—

Allith Mfg. Co., Reliable and Alligator, 50%; Reliable Cold Storage, 50%
Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.30
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—

See *Pumps—*

Lifters, Transom—

R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet.....	*$2.50*	*2.25*	*2.00*
75 feet.....	*$2.10*	*1.80*	*1.65*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines, White Cotton.....20%
Shade Cord, Cotton or Linen....20%

Locks—Cabinet—

Cabinet Locks.....*33⅓%*

Door Locks, Latches, &c —

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass, 55&5%; Crescent, 60%; Iron, 60%; Window Ventilating, 40&20%; Robinson Pat. Ventilating Sash Lock, 33⅓%.
Pullman Patent Ventilating Lock..35%
Reading Sash Locks.....40%

Machines—Boring—

Com. Upr't, without Augers,
$2.00@2.25
Com. Angl'r, without Augers,
$2.25@2.50
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—

Reisinger Invincible Hand Power.....₱ doz. $18.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclon. High Speed Chain Hoist.....25%

Ice Cutting—

Chandler's.....12½%

Washing

Boss Washing Machine Co.: Per doz.
Boss No. 1.....$57.00
Boss Rotary.....$57.00
Champion Rotary Banner No. 1..$57.00
Standard Champion No. 1.....$50.00
Standard Perfection.....$27.00
Cincinnati Square Western.....$33.00
Uneeda American, Round.....$33.60

Mallets—

Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Applewood.....*doz. 45&5@50%*

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list.50%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Divine's Red Devil.....30%
Lippincott's.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted

Cheapest, 10-in., $2.00; 12-in., $2.10, etc.
Cheap, 10-in., $2.25; 12-in., $2.45, etc.
Better Grade, 10-in., $3.00; 12-in., $3.25, etc.

	12	*14*	*16*	*18-in.*
High Grade....	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60%
Pennsylvania, Jr., Ball Bearing, 50&10&5%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70%
Style B, Low Wheel.....70%
Style C, High Wheel, spcl, list, 70&10%
Style D, High Wheel, spcl, list..70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse.....40&5%
Pony.....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—

Wire Nails and Brads, Miscellaneous.....*87½@87½&10%*
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Coleman	13	12	12	11	11	.....net
New Haven..	23	21	20	19	18	...40&5%
Livingston	19	18	17	16	16	.....10%

Western.....₱ lb 8½¢
Jobbers' Special Brands.....*per lb.9@10¢*

Picture—

	1½	*2*	*2½*	*3*	*in.*
Brass H'd.	*45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head...	*1.10*	*1.10*	*1.10*		*.. gro*

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: Off list.
Square, Blank or Tapped..*5.80¢*
Hexagon, Blank or Tapped.6.30¢
Square, Blank or Tapped, C., T. & R.....*5.60¢*
Hexagon, Blank or Tapped, C., T. & R.....*6.30¢*
Hot Pressed:
Square, Blank.....*5.80¢*
Hexagon, Blank.....*6.30¢*
Square, Tapped.....*5.50¢*
Hexagon, Tapped.....*5.90¢*

Oakum—

Best.....*lb.*, 6½¢
U. S. Navy.....*lb.*, 6¢
Navy.....*lb.*, 5¢
Plumbers' Spun Oakum..2¾@3¢

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....75%
Chase or Paragon:
Brass and Copper.....50&10%
Zinc.....65&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%
Maple City Mfg. Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers—Can—*Per doz.*

Sprague, Iron Handle....*30@35¢*
Sprague, Wood Handle...*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
Yankee Can and Bottle Opener, ₱ doz., net, $0.75; Little Gem, ₱ doz., net.....$0.65

Egg—

Hartigan Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope.....*20@25¢*

Rubber—

(Fair quality goods.)
Sheet, C. I.....*11@12¢*
Sheet, C. O. S.....*11@12¢*
Sheet, C. B. S.....*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ₱ lb. 80¢.....25%

Miscellaneous—

American Packing...*lb.* 7@10 ¢
Cotton Packing.....*lb.* 16@25 ¢
Italian Packing.....*lb.* 9@12½¢
Jute.....*lb.* 4@ 4½¢
Russia Packing.....*lb.* 8@11 ¢

Pails, Water, Well, &c.—

See *Buckets.*

Pans—Dripping—

Standard List.....*65&7½@70%*
Edwards, Royal Blue.....65&7½%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch.....	*12*	*14*	*16*	*18*
Per doz....	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos: lb.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.3½@5¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.....*6¢*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.....*.3@5¢*
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll.....*$8@58¢*
Medium weight, 30 lbs. to roll.....*56@70¢*
Heavy weight, 40 lbs. to roll...*75@78¢*
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....*$5.50*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—

1 ply (roll 400 sq. ft.), ton....*$34.00@38.00*
2 ply, roll 108 sq. ft.....*65¢*
3 ply, roll 108 sq. ft.....*88¢*
Slater's Felt (roll 500 sq. ft.)..*80¢*

Sand and Emery—

Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth....*25%*
Emery Paper and Cl'h..50&10@60%

Parers—Apple—

Goodell Co.:
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
New Lightning.....₱ doz. [illegible]
Turn Table '98.....₱ doz. $6.00
White Mountain.....₱ doz. $5.00
Bonanza Improved.....each $7.50
Dandy.....each $10.00
Eureka Improved.....each $20.00
New Century.....each $20.00
Ranger.....each $25.00
Livingston Nail Co.:
Daisy.....₱ doz. $4.00
Little Star.....₱ doz. $5.00
Rocking Table.....₱ doz. $6.25
Reading Hardware Co.:
Advance.....₱ doz. $4.50
Baldwin.....₱ doz. $4.00
Reading 72.....₱ doz. $5.25
Reading 78.....₱ doz. $6.25

Potato—

Saratoga.....₱ doz. $7.00
White Mountain.....₱ doz. $6.00

Picks and Mattocks—

(List Jan., 1908.)
List.....*70&10@70&10&10%*
Cronk's Handled Garden Mattock, ₱ doz., No. 2, $2.60; No. 3, $3.10.

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass .....50@50&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—
Standard, 2-6 in.....60&10@—%
Extra Heavy, 2-6 in..70&10@—%
Fittings, Standard and Heavy, 75&10@—%

Pipe, Merchant—

	Consumers, Carloads. Steel. Blk.	Galv.	Iron. Blk.	Galv.
	%	%	%	%
⅛ & ¼ in...	64	48	62	...
⅜ in.....	66	52	64	50
½ in.....	68	56	66	54
¾ to 6 in...	72	62	70	60
7 to 12 in....	69	54	67	52

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class .....77@78%
Second-class .....80@81%

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue....	$6.25	$7.25
6 in., Standard Blue....	6.75	7.75
7 in., Standard Blue....	7.75	8.75
5 in., Royal Blue.....	7.00	8.00
6 in., Royal Blue.....	7.50	8.50
7 in., Royal Blue.....	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color..	$6.15	$7.15
6 in., Uniform Color..	6.65	7.65
7 in., Uniform Color..	7.65	8.65

Planes and Plane Irons—

Wood Planes—
Bench, first qual.....30@30&10%
Bench, second qual...40@40&10%
Molding .....25@25&10%
Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Union 60%

Iron Planes -
Chaplin's Iron Planes.....50&10%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06.....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse.....₩ doz. $8.00

Plates—
Felloe .....*lb.* 4@4¼¢

Pliers and Nippers -
Button Pliers....75&5@75&10&5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 8 10 12-in.
$2.00 $2.25 $2.75 $3.50
Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard, 35%; Elm City, 35%; Paragon, 50%; Lodi, 55%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels....60&10%
Disston's Pocket Levels.....60&10%
Stanley's Duplex.....30%
Woods' Extension.....33⅓%

Points, Glaziers'—
Bulk and 1-lb. papers....*lb.* 9 ¢
½-lb. papers.....*lb.* 9½¢
¼-lb. papers.....*lb.* 10 ¢

Police Goods—
Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—
Prestoline Liquid, No. 1 (¼ pt.), ₩ doz., $3.00; No. 2 (1 qu.), $8.00..40%
Prestoline Paste.....60%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₩ doz. 50¢; ₩ gro. $4.50; ½ lb boxes, ₩ doz. $1.25; 1 lb boxes, ₩ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₩ doz., $1.25.
Barkeepers' Friend Metal Polish, ₩ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ₩ lb 10¢
Black Eagle, Liquid, ⅛ pt. cans, ₩ doz. 75¢
Black Jack Paste, ⅝ lb cans, ₩ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ₩ gr. $5.75.....10%
Dixon's Plumbago.....₩ lb 8¢
Fireside .....₩ gr. $2.50
Gem, ₩ gr. $4.50.....10%
Japanese .....₩ gr. $3.50
Jet Black.....₩ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ₩ doz. $1.50

Poppers, Corn—
1 qt. Square..doz.$0.80; gro.$8.75
1 qt. Round..doz.$0.90; gro.$10.00
1½ qt. Square.doz.$1.00; gro.$11.00
2 qt. Square..doz.$1.25; gro.$13.50

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled .....*35&10%*
Tinned .....*50&10%*

Powder—
In Canisters:
Duck, 1 lb.....*each 45¢*
Fine Sporting, 1 lb....*each 75¢*
Rifle, ½-lb.....*each 15¢*
Rifle, 1-lb.....*each 25¢*
In Kegs:
12½-lb. kegs.....*$3.50*
25-lb. kegs.....*$4.50*
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk).....	$12.00	$15.00
Half Keg (12½ lb bulk)...	6.25	7.75
Quarter Keg (6¼ lb bulk).	3.25	4.00
Case 24 (1 lb cans bulk)..	14.00	17.00
Half case 12 (1 lb c. bk)..	7.25	8.75

Presses—

Fruit and Jelly—
Enterprise Mfg. Co.....20@25%

Seal Presses—
Morrill's No. 1, ₩ doz., $20.00.....50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail—
Cyclops 50%
Miller's Falls, No. 3, ₩ doz., $12.00..
33⅓&10%
Morrill's No. 1, Nail Puller, ₩ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
The Scranton Co. Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B.....70%
Giant 50%
Staple Pullers, Utica and Davison 60%

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.25	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in.....*17@20¢*
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....*20@21¢*
Acme, No. 35..1¾ in., 12¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle .....50&10%
Wrought Steel, Eagle.....17@20¢
Fox-All-Steel, Nos. 3 and 1, 2 in.... ₩ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in.....20½¢
No. 26, Trov..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26..1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern *60%*
Pitcher Spout.....*75&5@75&10%*
Wood Pumps, Tubing, &c....*50%*
Barnes Dbl. Acting (low list)....40&5%
Barnes Pitcher Spout.....5&10%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....₩ doz. $6.50
Flint & Walling's Fast Mail Hand. (low list).....50%
Flint & Walling's Fast Mail (low list) 50%
Flint & Walling's Tight Top Pitcher. 75&10%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list).....40&5%
Myers' Power Pumps.....40&5%
Myers' Spray Pumps.....40&5%

Pump Leathers—
Plunger and Valve Leathers—Per gro.:

No.....	1	2	3	4	50%
	$5.00	6.00	7.00	8.00	
Cup Leathers—Per 100:					
Inch....	2½	3	3½	4	
	$5.00	7.00	9.00	12.00	

Punches—
Saddlers' or Drive, good.....*doz. 50@75¢*
Spring, single tube, good quality *$1.75*
Revolving (4 tubes)....*doz.$3.50*
Bemis & Call Co.'s Cast St'l Drive.50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 35%; Paragon, 50%; Lodi.....55%
Tinners' Hollow, P., S. & W. Co..40%
Tinners' Solid, P., S. & W. Co., ₩ doz., $1.44.....40%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢.....*30%*
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail..₩ ft. 3¼¢
O. N. T. Rail.....$3.12
Griffin's:
xxx, ₩ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ₩ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ₩ 100 ft. $3.45
O. N. T., ₩ 100 ft., 1 in., $3.00; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in.....₩ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ₩ 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
McKinney's:
Hinged Hanger Track, ₩ ft., 11¢.
1 x 3-16 Track.....60&5%
Myers' Stayon Track.....60&5%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ₩ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Cronk's:
Steel Garden: Champion, 75%; Ideal, 80%; Victor.....80&25%
Queen City Lawn, ₩ doz., 20 teeth, $2.85; 24, $3.00.....net
Anticlog Lawn, ₩ doz.....$1.00
Malleable Garden.....70&10%
Ideal Steel Garden, ₩ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Lawn Queen, 20-tooth....₩ doz. $3.15
Lawn Queen, 24-tooth....₩ doz. $3.25
Paragon, 20-tooth.....₩ doz. $2.70
Paragon, 24-tooth.....₩ doz. $2.75
Steel Garden, 14-tooth....₩ doz. $2.40
Malleable Garden, 14-tooth, ₩ doz. $2.00@2.25

Rasps, Horse—
Disston's 75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.70&10@75%
McCaffrey's American Standard, 60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—
Liana Bo-ras-ic.....60%
Fox Razors, ₩ doz., No. 42, $30.00; No. 41, $20.00; No. 82, Platina, $25.00. } 40%
Red Devil.....65%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N 6 PN, 24 N, 26 PN.....20%
2901 P, 33¼%; 2904 PN, 33¼%; 0924 N, 33¼%; 02284 N, 33¼%; 002904 PN, 33¼%; 902 N, 33¼%
986 PN, 2901 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed .....*70@70&10%*
White Porcelain Enamel..*50&10%*
Solid Brass or Bronze Metal..*40%*

Revolvers—
Single Action.....*95¢@$1.00*
Double Action, except 44 cal..*$2.00*
Double Action, 44 caliber....*$2.00*
Automatic *$4.00*
Hammerless *$4.50*

Riddles, Hardware Grade
16 in.....*per doz.*.*$2.50@$2.75*
17 in.....*per doz.*.*$2.75@$3.00*
18 in.....*per doz.*.*$3.00@$3.25*

Rings and Ringers—Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 doz.
Copper	$1.10	1.25	1.65 doz.

Hog Rings and Ringers—
Hill's Rings, gro. boxes.$4.25@$4.50
Hill's Ringers, Gray Iron, doz., 60@75¢
Hill's Ringers, Malleable Iron doz.80@95¢
Blair's Rings..per gro.$5.00@$5.50
Blair's Ringers...per doz.75@90¢
Brown's Rings.per gro.$5.25@$5.50
Brown's Ringers..per doz.75@90¢

Rivets and Burrs—
Copper *50%*
Carriage, Coopers', Tinners, &c.:
Black .....*70&10%*
Metallic Tinned.....*70%*

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 50 count, 23@25¢; Tin boxes, 100 count, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—
Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

Rope—
Manila, 7-16 in. diam. and larger:
Pure .....*lb.*, 10½@11½¢
Sisal, 7-16 in. diam. and larger:
Pure .....*lb.*, 7½@8¢
Sisal, 7-16 in. diam. and larger:
No. 2 quality.....*lb.*, 6½@7¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed .....*lb.*, 6½@7¢
Pure .....*lb.*, 7¾@8¼¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred:
Mixed .....*lb.*, 5¼@5¾¢
Pure .....*lb.*, 6½¢
Cotton Rope:
Best, ¼-in. and larger...*18@20¢*
Medium, ¼-in. and larger.16@17¢
Common, ¼-in. and larger..*10¢*
In coils, ½¢ advance.
Jute Rope:
Thread, No. 1, ¼-in. & up, lb., 6¼¢
Thread, No. 2, ¼-in. & up, lb., 5¾¢

Wire Rope—
Galvanized .....*37½&2½%*
Plain .....*45&2½%*

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal.....20%

Rules
Boxwood .....*60@60&10%*
Ivory .....*35&10@35&10&5%*
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....50@50&10%
Stephens' Combination.....55%
Stationers' .....50@50&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....50&10%
Upson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 18 in. wide 60%
Band, ¼ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws, 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws 30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. ..... 25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A A 25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack Saw Frames 30%
Simonds File Co. 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete ..... 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 30&10&5%
Sterling Hack Saw Frames ..... 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 ..... 10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Whitaker Mfg. Co.:
National Hand Blades 40%
National Hand Frames ..... 30&5%
National Power Blades ..... 30&10%

Scroll—

Barnes, No. 7, $15 ..... 35%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00 ..... 15&10%

Scales—

Family, Turnbull's ..... 50@50&10%
Counter:
Hatch, Platform, ½ oz. to ¼ lbs. ..... doz., $5.50
Two Platforms, ½ oz. to 8 lbs. ..... doz., $16.00
Union Platform, Plain. $1.70@1.90
Union Platform, Stpd. $1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—

Box, 1 Handle ..... doz. $2.00@2.25
Box, 2 Handle ..... doz. $2.50@2.60
Ship ..... Light, $2.00; Heavy, $2.50
Chapin-Stephens Co., Box ..... 30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1¼, $3.00@3.25; 1¼ $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood ..... 70&10@70&10&10%
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

Coach, Lag and Hand Rail—

Lag, Cone Point ..... 80@80&5%
Coach, Gimlet Point, 75&10@75&10&5%
Hand Rail ..... 70&10@75%

Jack Screws—

Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—

Cut Thread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—

Set (Iron) ..... 75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10&7½%
Hex. Hd. Cap ..... 70&10&7½%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—

List July 23, 1903.
Flat Head, Iron ..... 87½&5@..%
Round Head, Iron ..... 85&5@..%
Flat Head, Brass ..... 80&5@..%
Round Head, Brass ..... 77½&5@..%
Flat Head, Bronze ..... 75&5@..%
Round Head, Bronze ..... 72½&5@..%
Drive Screws ..... 87½&5@..%

Scroll Saws—

See *Saws, Scroll.*

Scythes— *Per doz.*

Grass, No. 1, Plain ..... $7.00@7.50
Clipper, Bronzed Webb ..... $7.25@7.75
No. 3 Clipper, Pol'd Webb ..... $7.50@8.00
No. 6 Clipper and Solid Steel ..... $7.75@8.25
Bush, Weed and Bramble, Nos. 11, 12 and 13 ..... $7.25@7.75
Grain, No. 1 ..... $9.00@9.50
Bronzed Webb, No. 1 ..... $9.25@9.75
Nos. 3 and 4 Clipper, Grain ..... $9.50@10.00
Solid Steel, No. 6 ..... $10.00@10.50

Seeders, Raisin—

Enterprise ..... 25@30%

Sets— Awl and Tool—

Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 ..... 20&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00

Sets, Nail—

Octagon ..... gro. $3.50@3.75
Buck Bros. 37½%
Cannon's Diamond Point, ℔ gro. $12 ..... 40&10%
Mayhew's ..... ℔ gro. $9.90
Snell's Corrugated, Cup Pt. ..... 40&10%
Snell's Knurled, Cup Pt. ..... 40&10%
Victor Knurled Cup Pt. ..... ℔ gro. $7.50

Rivet—

Regular list ..... 75@75&10%

Saw—

Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut $20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15.60
No. 1 Old Style $10.00
Special $16.25
Giant Royal Cross Cut ..... ℔ doz. $8.00
Royal, Hand ..... ℔ doz. $4.50
Tainter Positive ..... ℔ doz. $6.75

Shaving—

Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s 75%

Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.70
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50

Skate—

Smith & Hemenway Co., Eureka 50%

Shaves, Spoke—

Iron ..... doz. $1.25
Wood ..... doz. $2.00
Bailey's (Stanley R. & L. Co.) 45%
Chapin-Stephens Co. ..... 30@30&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%

Shears—

Cast Iron..	7	8	9 in.	
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good	*$13.00*	*15.00*	*17.00*	*gro.*
Cheap	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap ..... 70@70&10%
Best quality, Nickel ..... 60@60&10%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%
J. Wiss & Sons Co.:
Best Quality Jap'd ..... 60&10%
Best Quality Nickeled ..... 50&10%
Tailors' 25%

Tinners' Snips—

Steel Blades ..... 20&5@20&10%
Steel Y ¼d Blades ..... 40&10@50%
Forged Handles, Steel Blades, Berlin 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. ..... 33⅓&7½%
Niagara Snips 40%
P. S. & W. Forged Handles, 25%; W. R. W. ..... 40&10%
J. Wiss & Sons Co.:
Wiss Forged Steel 25%

Pruning Shears—

Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook only, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P. S. & W Co. ..... 40&10%
Columbian Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand ..... 60&10%

Sheaves— Sliding Door—

Reading 40%
R. & E. list 15%

Sliding Shutter—

Reading list 40%
R. & E. list 10%

Shells—Shells, Empty—

Brass' Shells, Empty:
Climax, 10 and 12 gauge ..... 65&10%
Club, Rival, 65&5%; First Quality ..... 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge ..... 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade ..... 25&5%
Union, League, 12 and 12 gauge; Rival Grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge ..... 20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade 20%

Shells, Loaded—

Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders ..... 40&5%
Arrow, Smokeless Powders ..... 40&10&10%
Winchester:
Smokeless Repeater Grade ..... 40&5%
Smokeless Leader Grade ..... 40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.

Edwards Mfg. Co.:	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:
Dixie, 14 x 20 in. ..... $4.25 ..... $5.50
Dixie, 10 x 14 in. ..... 4.50 ..... 6.00
Dixie, 7 x 10 in. ..... 5.00 ..... 6.75

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron ..... per keg. $4.10
Steel ..... per keg. $3.85
Burden's, all sizes ..... ℔ keg $3.90

Shot—

25-lb. bag.
Drop, up to B $1.85
Drop, B and larger 2.10
Buck 2.10
Chilled 2.10
Dust 2.30

Shovels and Spades—

Association List, Nov. 15, 1902. 40%
Avery Stamping Co. 40%

Snow Shovels—

Long Handle ..... $3.25@$3.50
Wood and Mall. D. Handle. $3.75@$4.00

Sieves and Sifters—

Hunter's Imitation ..... gro. $9.50@10.00
Hunter's Genuine ..... per gro. $12.00@12.50

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ℔ doz. $39.00

Sieves, Seamless Metallic

	Per dozen.			
Mesh	*14*	*16*	*18*	*20*
Iron Wire	*1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested ..... doz. $0.90@0.95
Mesh 20, Nested ..... doz. $1.00@1.05
Mesh 24, Nested ..... doz. $1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:
12 x 12 to 22 x 36 in 60%
20 x 40 to 24 x 50 in 50%
24 x 60 to 24 x 120 in 30%
Barnes' low list:
Up to and including 20 x 36 in. ..... 50&5%
20 x 40 to 24 x 50 in. 45%

NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron ..... 70@75&10%
Steel ..... 40@45%

Slates, School—

Factory Shipments.
"D" Slates ..... 50&10&10%
Eureka, Unexcelled Noiseless ..... 60&5 tens
Victor A, Noiseless ..... 60&5 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40%
Jockey 25%

Snaths—

Scythe ..... 55@60%

Snips, Tinners—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton ..... 50&10%
Rogers & Bro., William Rogers Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous

German Silver ..... 60@60&5%

Tinned Iron—

Teas ..... per gro. $0.50@55¢
Tables ..... per gro. $0.90@$1.00

Springs— Door—

Bardsley's Spring and Check 40%
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 35%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 39 in. ..... ℔ doz. $1.10

Carriage, Wagon, &c.—

1¼ in. and Wider:	*Per 100 lb.*
Black	*$4.75@$5.00*
Half Bright	*$4.75@$5.00*
Bright	*$5.25@$5.50*

Painted Seat Springs:
1½ x 2 x 26 ..... per pr. 49@52¢
1½ x 3 x 28 ..... per pr. 73@77¢

Sprinklers, Lawn—

American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ℔ doz. $12.00
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $20 ..... 30%

Squares—

Nickel plated ..... List Jan. 5, 1900.
Steel and Iron ..... 80@80&5%
Rosewood Hdl. Try Squares and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel 15%

Squeezers, Lemon

Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade ..... doz. $1.25
Tinned Iron ..... doz. $0.75@1.25
Iron, Porcelain Lined ..... doz. $1.75

Staples—

Barbed Blind ..... 85&5@85&10%
Electricians' ..... 80&10&10@85%
Fence Staples, Plain, $2.15; Galvanized $2.45
Poultry Netting Staples ..... per lb. 3¼@3½¢

Steels, Butchers'—

Dick's 30%
Foster Bros. 30%

Steelyards— .... 30@30&10%

Stocks and Dies—

Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stoners, Cherry—

Enterprise ..... 25@30%

Stones—Oil, &c.

Pike Mfg. Co., 1907 list: ℔ lb. (33⅓%)
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1 ..... $4.00
Lily White Washita, 4 to 8 in. ..... 60¢
Rosy Red Washita, 4 to 8 in. ..... 60¢
Washita St., Extra, 4 to 8 in. ..... 50¢
Washita St., No. 1, 4 to 8 in. ..... 40¢
Washita St., No. 2, 4 to 8 in. ..... 25¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 90¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 50¢
India Oil Stones (entire list) 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit 40%
Quickcut Emery and Corundum Axe Stone, Double Grit 33⅓%
Quickcut Emery Rubbing Bricks 40%
Hindostan No. 1, R'g'lar ..... ℔ lb 8¢
Hindostan No. 1, Small ..... ℔ lb 10¢
Axe Stones (all kinds) 33⅓%
Turkey Oil Stones, Extra, 5 to 8 in. ..... ℔ lb 80¢
Queer Creek Stones, 4 to 8 in. ..... 20¢
Queer Creek Slips ..... 40¢
Sand Stone ..... 6¢

Scythe Stones—

Pike Mfg. Co., 1901 list:
Black Diamond S. S. ₱ gro. $12.00
Lamoille S. S. ₱ gro. $11.00
White Mountain S. S. ₱ gro. $9.00
Green Mountain S. S. ₱ gro. $6.00
Extra Indian Pond S.S. ₱ gro. $7.50
No. 1 Indian Pond S.S. ₱ gro. $7.00
No. 2 Indian Pond S.S. ₱ gro. $4.50
Leader Red End S. S. ₱ gro. $4.50
Quick Cut Emery ₱ gro. $10.00
Pure Corundum ₱ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%
Electro (Artificial), ₱ gro., $12.00 33⅓%
Lightning (Artificial), ₱ gro., $18.00 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers ₱ gro. $9.00

Stops— Bench—

Millers Falls 15&10%
Morrill's, ₱ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 50@50&10%

Plane—

Chapin-Stephens Co. 20%

Straps— Box—

Acme Embossed, case lots. 20&10&10%
Cary's Universal, case lots. 20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points. . doz. 55¢
All Steel Socket. . . doz. $2.00@2.25
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00 20%

Stuffers, Sausage—

Enterprise Mfg. Co. 25@25&7½%
National Specialty Co., list Jan. 1, 1902 30&5%
P., S. & W. Co. 40&10&5%

Sweepers, Carpet—

Bissell Carpet Sweeper Co.: ₱ doz.
Superba, Crotch Mahogany $36.00
Triumph, Fancy Veneers $33.00
Parlor Queen, Fig. Rosewood $30.00
Elite, Hungarian Ash $29.00
Am. Queen, Fig. Mahogany $27.00
Ideal, Bird's-Eye Maple $25.00
Grand Rapids, Nickel, $24.00; Japan $22.00
Standard, Nickel, $22.00; Japan $20.00
Crown Jewel, Nickel, $21.00; Jap. $19.00
Crystal, Glass Top $36.00
Grand, 17 in. wide $36.00
Club, 24 in. wide $54.00
Hall, 28 in. wide $60.00

NOTE.—Rebates: 50c per dozen on three dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks. . . 90&40%
American Cut Tacks. . . . . 90&40%
Swedes' Cut Tacks. . . . . 90&40%
Swedes' Upholsterers'. . . . . 90&50%
Gimp Tacks. . . . . 90&50%
Lace Tacks. . . . . 90&50%
Trimmers' Tacks. . . . . 90&40%
Looking Glass Tacks. 60%
Bill Posters' and Railroad Tacks, 90&50&10%
Hungarian Nails. . . . . 80&20%
Finishing Nails. 70%
Trunk and Clout Nails. . . 80&10%

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks. . . . . 90&5 tens @—%

See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.: Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$5.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin . . 50@—%
Patent Leather. . . . . 25@30&5%
Steel . . . . . $3 1-3&5%
Chesterman's . . . . . 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin. . . . . 40&10@50%
Favorite, Duck and Leather. . . . . 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin. . . . . 40&10@50%
Metallic . . . . . 30@30&5%
Patent Bend, Leather. . . . 25&5@25&10%
Pocket . . . . . 40@40&5%
Steel . . . . . 33⅓&@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger. . . per 100 lbs. $2.75@3.00

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c. . . . . 30@33⅓%

Ties, Bale—Steel Wire—

Single Loop. . . . . 80&10&5%
Monitor, Cross Head, &c. 70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White. . . . . 20@20&5%

Haying—

Myers' Hay Tools. 45%

Miniature—

Smith & Hemenway Co.'s, Davidson, ₱ doz., Nickel Plated, $1.50; Gold Plated. $2.00

Saw—

Atkins' Cross Cut Saw Tools. . . . 35&5%
Simonds' Improved. 33⅓%
Simonds' Crescent. 25%

Ship—

L. & I. J. White. 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro. . . . . $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida. . . . . 75&10%
Newhouse . . . . . 45@45&5%
Hawley & Norton. 65%
Victor . . . . . 75@75&10%
Oneida Community Jump. 50%
Hector . . . . . 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, ₱ doz., $13.25. . $11.50 doz.
No. 3, Rat, ₱ doz., $6.50. . . $5.75 doz.
No. 3½, Rat, ₱ doz., $5.25. $4.70 doz.
No. 4, Mouse, ₱ doz., $3.85. $3.00 doz.
No. 5, Mouse, ₱ doz., $3.00. $2.25 doz.
Oneida Community:
Out o' Sight, Mouse, ₱ doz. . . . $0.60
Out o' Sight, Rat, ₱ doz. 1.25
Easy Set, Mouse, ₱ doz. 35
Easy Set, Rat, ₱ doz. 1.00
Wood Choker, Rat, ₱ doz. holes, .12
Premier Tin Choker, 5 hole, ₱ doz. traps. 75

Trowels—

Disston Brick and Pointing. 25%
Disston Plastering. 20%
Disston " Standard Brand " and Garden Trowels. 30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels. . ₱ gro. $6.00
Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern. . . . . 50&10%
Western Pattern. . . . . 60&10%
Handy Trucks. . . . . ₱ doz. $16.00
Grocery . . . . . ₱ doz. $15.00
McKinney Trucks. . . . . each, net $10.00
Model Stove Trucks. . . . . ₱ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized	$67	$79	$89	$99

10&5%

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls. 23@25¢
No. 12, ¼ and ½-lb. Balls. 21@23¢
No. 18, ¼ and ½-lb. Balls. 18@20¢
No. 24, ¼ and ½ -lb. Balls. 17½@19½¢
No. 36, ¼ and ½-lb. Balls. 17@19¢
Chalk Line, Cotton ½-lb. Balls . . . . . 26@31¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz. . . . . 11@19¢
Cotton Wrapping, 5 Balls to lb., according to quality. . . 15½@23¢
American 2-Ply Hemp, ¼ and ½-lb. Balls. . . . . 14½@15½¢
American 3-Ply Hemp, 1-lb. Balls . . . . . 15½@16½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine). 10½@11½¢
India 3-Ply Hemp, 1-lb. Balls 10½@11½¢
India 3-Ply Hemp, 1½-lb. Balls, 10@11¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls . . . . . 13½@14½¢
Mason Line, Linen, ½-lb. Bls. 47¢
No. 2½ Mattress, ¼ and ½-lb. Balls, according to quality, 30@60¢
Wool, 3 to 6 ply. . . . B 9¢; A 10¢

Vises—

Solid Box. . . . . 50@50&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable. 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co. 40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel. 25%
Star, Solid Jaw. 40%
Hollands':
Machinists' . . . . . 40@40&5%
Keystone . . . . . 65&5&70%
Lewis Tool Co.:
Adjustable Jaw. 30%
Monarch, 50%; Solid Jaw. 50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip. 15%
Merrill's 20%
Millers Falls Oval Slide Pattern. 60&10%
Parker's:
Victor, 20@25%; Regulars. . . . . 20@25%
Vulcan's . . . . . 40@45%
Combination Pipe. . . . . 55@60%
Prentiss . . . . . 20@25%
Rock Island 25%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps. 30%
Perfection Saw Clamps, ₱ doz. . . . $4.50
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect. 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe. . 60@60&5%
Massey's Quick Action Pipe. 40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870 40%.
Rock Island Pipe. 25%

Wads—*Price per M.*

B. E., 11 up. . . . . 60¢
B. E., 9 and 10. . . . . 70¢
B. E., 8. . . . . 80¢
B. E., 7. . . . . 80¢
P. E., 11 up. $1.00
P. E., 9 and 10. . . . . 1.25
P. E., 8. . . . . 1.50
P. E., 7. . . . . 1.50
Dis. 15%
Ely's B. E., 11 and larger. $1.70@1.75
Ely's P. E., 12 to 20. . . . $3.00@3.25

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled . . . . . 45&10%
Ground . . . . . 50&5%
Plain or Unground. 60%
Country Hollow Ware, per 100 lbs. $3.00
White Enameled Ware:
Maslin Kettles. . . . . 65&10%
Covered Wares:
Tinned and Turned. . . . . 35&10%
Enameled . . . . . 45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware. 33⅓%
Iron Clad Ware. . . . . 70&10%
Lava and Volcanic, Enameled. . 40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles. . 65@65&5%
Avery Kettles. 60%
Porcelained . . . . . 50&5&50&10%
Never Break Spiders and Griddles. . . . . 65&5%
Never Break Kettles. 60%
Solid Steel Spiders and Griddles. 65&5%
Solid Steel Kettles. 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone. . . . 40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame. $4.05
Red Star, family size, stationary protector $4.05
Double Zinc Surface:
Saginaw Globe, family size, stationary protector. $3.55
Cable Cross, family size, stationary protector. $3.60
Single Zinc Surface:
Naiad, family size, open back, perforated $3.00
Single Saginaw Globe. $2.85
Brass Surface:
Brass King, Single Surface, open back $4.05
Nickel Plate Surface:
No. 1001 Nickel Plate, Single, Surface $3.60
Glass Surface:
Glass King, Single Surface, open back $3.95
Enamel Surface:
Enamel King, Single Surface, ventilated back. $3.95

Washers—Leather, Axle—

Solid . . . . . 90@90&10%
Patent . . . . . 90@90&5%
Coil: ⅞ 1 1⅛ 1¼ Inch. . . .
9¢. 10¢. 11¢. 14¢. per box

Iron or Steel—

Size bolt. . . . 5-16 ⅜ ½ ⅝ ¾
Washers. . . . $4.90 4.00 2.70 2.50 2.30
The above prices are based on $6.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots. . . . . per lb. 1¾@2¢

Wedges—

Oil Finish. . . . . lb., . . @3¢

Weights—Hitching—

Covert Mfg. Co. . . . . 30&2%

Sash—

Per net ton, f.o.b. factory:
Eastern District. . . $25.00@$28.00
Southern Territory. $22.00@$24.50
Western and Central Districts . . . . . $22.50@$23.50

Wheels, Well—

8-in., $2.00; 10-in., $2.45; 12-in., $3.25; 14-in., $4.45.

Wire and Wire Goods—

Bright and Annealed:
6 to 9. . . . . 72&10&7½%
10 to 18. . . . . 72½&10&10%
19 to 26. . . . . 75&10&10&2½%
27 to 36. . . . . 77½&7½%
Galvanized:
6 to 9. . . . . 72½&10%
10 to 14. . . . . 72½&10&5%
15 to 16. . . . . 72½&10&5%
17 to 18. . . . . 72½%
19 to 26. . . . . 70&5&2½%
27 to 36. . . . . 65&10&10%
Coppered:
6 to 9. . . . . 65&10&10%
10 to 14. . . . . 70&10&5%
15 to 18. . . . . 65&10&10&10%
19 to 26. . . . . 70&5&2½%
27 to 36. . . . . 72½&10&2½%
Tinned:
6 to 18. . . . . 67&10&10%
Brass . . . . . 17¼¢ lb., base
Copper . . . . . 32¢ lb., base
Cast Steel Wire. 50%

Spooled Wire—

Annealed and Tinned, 70&10&10&10%
Brass and Copper. . . 60&10&10&10%
Retailers' Assortments, per box, $2.10@$2.40

Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods. . . . . 90&25@—%
Brass Wire Goods. . . . 90@90&10%
Brass Cup and Shoulder Hooks, 80&15%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&2½@80&7½%
Painted Screen Cloth, 100 ft., $1.35
Standard Galv. Hardware Grade: Per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh. . . . $2.75
Nos. 4 and 5 Mesh. $3.00
No. 6 Mesh. $3.25
Nos. 7 and 8 Mesh. $3.75

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural . . . . . 80&10%
Alligator or Crocodile. . 70&10@75%
Baxter Pattern S Wrenches. . . 70&5@70&10%
Drop Forged S. . . . . 45@45&5%
Acme . . . . . 60&10%
Alligator Pattern, 70%; Bull Dog. . 70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut. 50%
Combination Black. . . . . 40&5%
Merrick Pattern. 50%
Boardman's 40%
Coes' Genuine Knife Hdl. . 40&10&5&5%
Coes' Genuine Steel Hdl. . 40&10&5&5%
Coes' Genuine Key Model. . 40&10&5&5%
Coes', Genuine Hammer Handle. . . . . 40&10&5&5%
Coes' " Mechanics' " . . . 40&10&10&5&5%
Donohue's Engineer. . . . . 40&10%
Eagle 70%
Gem Pocket. 50%
Hercules 70%
W. & B. Machinist:
Case lots. . . . . 50&5%
Less than case lots. 50%
W. & B. Railroad Special:
Case lots. 50%
Less than case lots. . . . . 40&10&5%
Solid Handles, P., S. & W., 50&10%; full cases. . . . . 50&10&5%
Stillson 65%
Uwanta Wrench Co.:
Uwanta Special, Iron Handle, 40&10&5%
Other Wrenches. 50%
Vulcan and Agrippa Chain. 50%
Whitaker Machinists':
Case lots. . . . . 50&10%
Less than case lots. 50%

Wrought Goods—

Staples, Hooks, &c., list March 17, '92. . . . . 85&10&10%

Zinc— (*Cask lots at mill.*)

Sheet. . . . . per 100 lb., $7.00

For the Table of "Current Metal Prices" see the First Issue of Every Month.